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**An Investigation of the Role of Parenting, Emotion  
Regulation, Emotional Eating and Lifestyle Factors in  
Adolescents' Weight**

**Arlene A. Ross**

**Doctorate in Clinical Psychology**

**The University of Edinburgh**

**2012**



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## LIST OF ABBREVIATIONS

AFHC	Adolescent Food Habits Checklist
BMI	Body mass index
DoH	Department of Health
DLW	Double Labelled Water
DEBQ	Dutch Eating Behaviour Questionnaire
EES-C	Emotional Eating Scale Adapted for Use in Children and Adolescents
EES-C-AAF	EES-C with the urge to eat in response to anger/frustration
EES-C-UNS	EES-C with the urge to eat in response to feeling unsettled
EES-C-DEP	EES-C with the urge to eat in response to depression
HDL	High-density lipoprotein
IOTF	International Obesity Task Force
NHS	National Health Service
NICE	National Institute for Clinical Excellence
PAQ	Parental Authority Questionnaire
RCT's	Random controlled trials
SIGN	Scottish Intercollegiate Guidelines Network
SMD	Standardised mean difference
REQ	The regulation of emotions questionnaire
WHO	World Health Organisation

## **ABSTRACT**

**Aim:** The aim of the study is to explore the relationships between an adolescent's weight and parenting style, emotional eating, and emotional regulation and lifestyle behaviours to further develop the understanding of the factors that contribute to the current epidemic of childhood obesity.

**Design:** A cross sectional survey design was used.

**Method:** 112 adolescents, aged between 16 and 18 from three secondary schools in Scotland completed a self-report questionnaire on their mother and father's parenting style, their own emotional regulation strategies, emotional eating and lifestyle behaviours. Their height and weight was measured by the researcher and used to calculate the adolescents' BMI.

**Results:** Overall, this study did not find that adolescent's healthy food habits, exercise and emotional eating predicted BMI. There were no significant relationships found between BMI and parenting style, emotional eating and emotional regulation.

**Conclusion:** These findings suggest that parenting style, emotional eating, emotional regulation and lifestyle behaviours are not related to adolescent weight.

### 1.1 The prevalence of obesity across the globe

This section will illustrate the prevalence of obesity worldwide and obesity rates from several countries will be discussed in relation to children and young people.

Obesity is a worldwide health problem and can be present very early in life and some reports indicate that it is prevalent in children as young as five years old. A recent review of 144 countries defined “overweight” as being 2 standard deviations above the World Health Organisation (WHO) standard median, and revealed that globally 43 million children under the age of 5 met this criterion (de Onis *et al.*, 2010). The authors further highlighted the fact that the percentage of children being classified as either overweight or obese had increased from 4.2 *per cent* in 1990 to 6.7 *per cent* in 2010, and they were expecting this to increase further to 9.1 *per cent* by 2020 (de Onis *et al.*, 2010). In contrast, the International Obesity Task Force (IOTF) (2010) reported a lower number of children who were overweight or obese, 200 million globally and 40 to 50 million of these were classified as obese using the IOTF age and gender BMI cut offs.

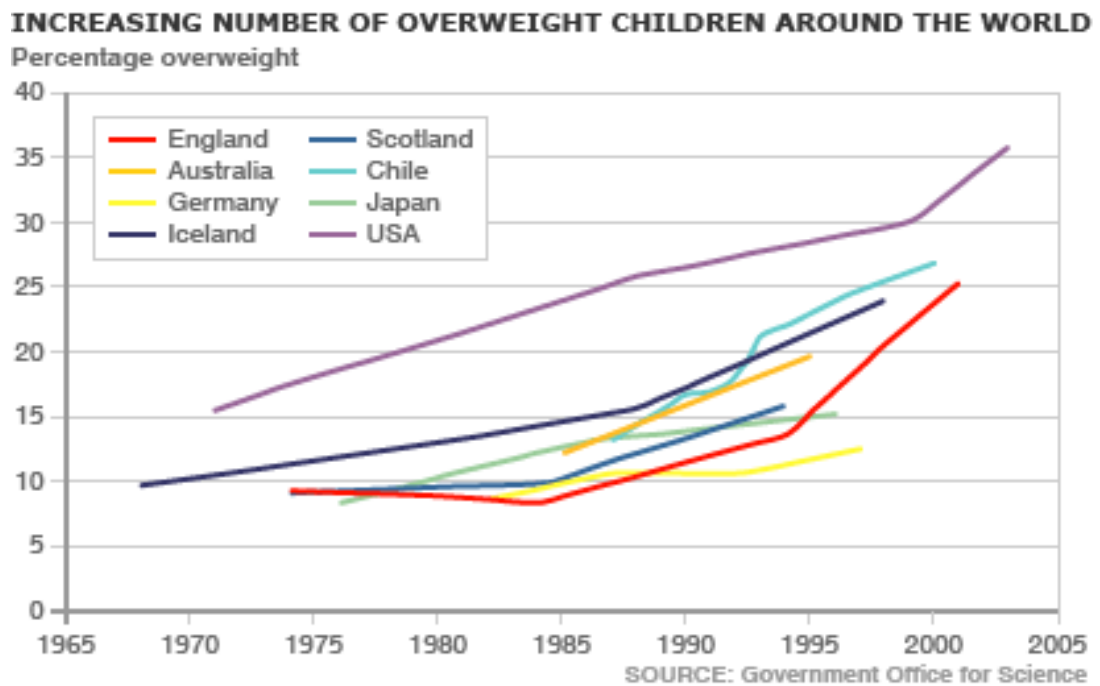
In the US, Gordon-Larsen *et al.* (2010) found that in 1996 13.3 *per cent* of adolescents were obese while in 2008 this had increased to 36.1 *per cent*. The increasing trend of obesity has also been evident in Brazil and China (Wang *et al.*,

2002), Australia (Patton *et al.*, 2011), Norway (Bjornely *et al.*, 2009) and Sweden (Holmback *et al.*, 2007). Regardless of exact numbers, it is clear that most agree that there is an increasing number of children, including the very young, who are either overweight or obese. These contrasting figures might be related to the different definitions of obesity that these studies have used.

### **1.1.1 Prevalence in the United Kingdom**

Scotland is often referred to as “the sick man of Europe” (Greenwood & Tulloch, 2004) partly because of the unusually high prevalence rates of medical conditions (such as lung and cardiovascular disease) and premature deaths that relate to lifestyle factors. The prevalence rate of obesity for the adult population within Scotland is increasing and may be slightly higher than that in England.

The trend in prevalence of children who are overweight or obese is consistent across the sexes in Scotland and seems to have changed little over the last two decades. The percentage of boys who meet the criteria for being either overweight or obese in Scotland increased slightly from 27.8 *per cent* in 1998 to 29.4 *per cent* in 2009 (Scottish Executive, 2009). The Scottish Executive reported that over the same period the percentage of girls who were overweight or obese remained stable with a slight decrease from 28.3 to 27 *per cent*. The Department of Health highlighted a similar proportion of boys and girls in England being either overweight or obese (31 and 28 *per cent* respectively) (National Centre for Health Statistics, 2010).



**Figure 1: Increasing trends of obesity worldwide, taken from Government Office for Science (2007)**

In short, it is clear that there has been a vast increase in obesity across the world in recent decades. This problem is more pronounced in some regions and less in others. The US seems to have a somewhat greater problem although many parts of the world are catching up, as illustrated in Figure 1. The UK has increasing rates of obesity and there is some evidence that Scotland in particular has a somewhat greater problem, perhaps fairly predictable given its recent history in the field of lifestyle-related medical problems. However, within the Scottish child population in recent years there appears to be a slowing down of the rate of increase in obesity and perhaps a move towards stabilisation especially among girls. It appears that globally there is no evidence to indicate that the percentage of children and young people being categorised as either overweight or obese is decreasing.

## **1.2 Health consequences of obesity**

As illustrated in figure 1, obesity is on the rise and there are a number of reasons why being overweight or obese are a challenge to individuals and society. The aim of this section is to provide an overview of some of the common medical and psychological problems that can be associated with being overweight or obese.

### **1.2.1 Medical consequences of obesity**

A large number of medical problems are associated with or caused by being overweight or obese. It is beyond the remit of this thesis to detail all of these; rather the author will focus on a small number: metabolic syndrome, cardiovascular disease and diabetes.

#### **Metabolic Syndrome**

Metabolic Syndrome is the name for a cluster of physiological symptoms. To be diagnosed with metabolic syndrome a person needs to have at least three of the following metabolic symptoms: large waistline (what is referred to as central obesity), high triglyceride level (this is a type of fat found in the blood), low high-density lipoprotein (HDL) cholesterol level (HDL can be called good cholesterol which helps remove cholesterol from the arteries), high blood pressure or higher than normal fasting blood sugar (National Heart Lung and Blood Institute, 2012a).



Obesity can naturally lead to metabolic syndrome because the by-products of being substantially overweight or obese are the symptoms which define Metabolic Syndrome. Therefore, it is unsurprising that metabolic syndrome is relatively common among those who are overweight or obese. For example, within an Australian population of 6 to 9-year-olds it was found that 39 to 60 *per cent* of overweight children were classified as having metabolic syndrome (Golley *et al.*, 2006). Likewise, increased rates of the Syndrome have also been reported in US samples of children and adolescents (Cook *et al.*, 2003; Cruz *et al.*, 2004; Weiss *et al.*, 2004).

Metabolic Syndrome is associated with poorer health outcomes. An individual with Metabolic Syndrome is three times as likely to have a heart attack or stroke and five times more likely to develop Type 2 diabetes compared to an individual who has not been diagnosed with Metabolic Syndrome (Isomaa *et al.*, 2001; Stern *et al.*, 2004).

## **Cardiovascular Disease**

Cardiovascular disease is a term that refers to a variety of diseases that affect the heart when the heart and associated blood vessels are not working correctly. There are certain factors that can cause an increased risk of developing heart disease. These factors overlap with the symptoms of Metabolic Syndrome and include: high blood pressure, high cholesterol, obesity and low levels of physical activity (British Heart Foundation, 2012b).

Obesity in childhood has been related to a variety of cardiovascular risk factors in adulthood such as increased blood pressure, left ventricular hypertrophy (thickening of left heart muscle) and atherosclerosis (artery wall thickens) (Lauer *et al.*, 1988; Lauer & Clarke, 1989). Furthermore, a study of obese 5 to 17 year olds in the US found that 58 *per cent* of the 813 children surveyed were overweight and had at least one cardiovascular risk factor whereas 50 *per cent* had two or more risk factors (Freedman *et al.*, 1999).

## **Type 2 Diabetes**

Diabetes is characterised by raised levels of glucose. There are two main types. Type 1 which usually occurs during childhood where the cells in the pancreas responsible for creating the hormone insulin are destroyed and type 2 which occurs usually during mid-to-late adulthood, is associated with obesity and is characterised by insufficient or no insulin (WHO, 2011). Type 2 Diabetes is associated with a range of health-related complications including kidney failure, amputations, and cardiovascular disease (WHO, 2011). The presence of Type 2 Diabetes increases substantially the risk of myocardial infarction and death (50 *per cent* of those diagnosed with Diabetes die due to cardiovascular complications) (WHO, 2011).

The link between obesity and Type 2 Diabetes is well established, although it is certainly the case that not everyone who is obese develops Type 2 Diabetes. For instance, Mokdad *et al.* (2003) reported a significant relationship between Type 2

Diabetes and those who were either overweight or obese using a telephone survey of 195,005 adults across 51 states in the US. They found that adults with a BMI of 40 or higher compared to adults with normal weight had a significantly higher risk (OR = 7.37) of being diagnosed with Type 2 Diabetes (Mokdad *et al.*, 2003). The BMI was self-reported in this study which may impact on the accuracy of these data and therefore the prevalence of increased weight or obesity might be under or over-reported (more probably the former). This association has also been observed in children. For instance, a medical record review of 1027 patients up to the age of 19 within one region of the US found that 92 *per cent* (47) of patients diagnosed with Type 2 Diabetes had a BMI over the 90<sup>th</sup> percentile which they defined as being overweight (Pinhas-Hamiel *et al.*, 1996). The sample size of this study is small but does reflect the more extensive adult literature.

In summary, obesity is closely related to a range of medical conditions that can have serious consequences, including premature death. There is a great deal of overlap among many of these conditions so typically people with one condition frequently have others too. This trend toward poor health outcomes frequently starts in childhood so its course and the general path towards poor health can be set early in life. It is important that research continues to understand the factors that contribute to obesity in order to begin to reverse or stabilise the prevalence of obesity.

### 1.2.2 Psychological consequences of obesity

There is mixed evidence about whether or not overweight or obese children experience more psychological distress than their peers. This section will focus specifically on the evidence of a link between being overweight or obese, with depression and anxiety.

#### Depression

There is evidence to indicate that depression could be a risk factor for developing obesity. For example, a meta-analysis of eight longitudinal studies from the US and Europe with 55,387 participants of adults and children found that those who were obese ( $BMI \geq 30$ ) at baseline were 1.55 times more likely to have depression at follow-up (Luppino *et al.*, 2010). They found that from nine studies consisting of 6436 participants that those who were depressed at baseline were 1.58 times more likely to be obese at follow-up. In support of Luppino *et al.* (2010), a prospective study of 9374 adolescents in the USA found that clinical depression at baseline independently predicted obesity at one year follow-up (Goodman & Whitaker, 2002). 12.4 *per cent* of adolescents who were depressed at baseline and not previously obese were categorised as obese at follow up, whereas only 9.4 *per cent* of those who were not depressed at baseline became obese.

Similarly, there is evidence from research with substantially longer follow-up periods that clinical depression can lead to later obesity. A longitudinal study collected data

from 90 participants in the US who had depression at age 6 to 17 years and a control group (n=87) with no diagnosis of depression (Pine *et al.*, 2001). They found that those with depression in childhood were significantly more likely to have higher adult BMI values 10 to 15 years after initial assessment. Further research also supports the suggestion that depression predicts obesity including studies on UK samples (Gaysina *et al.*, 2011) and studies with follow up data over 20 years (Hasler *et al.*, 2005).

## **Anxiety**

There is evidence to indicate obesity is associated with anxiety; however, overall the evidence is equivocal. Much of this evidence comes from correlation studies showing association rather than causality. For instance, Scott *et al.* (2008) investigated the relationship between obesity and mental health problems in 7435 adults in New Zealand using face to face interviews. They found that those who were obese were one and a half times more likely to meet the diagnostic criteria for any anxiety disorder. Further support for this relationship comes from a study by Zhao *et al.* (2009) using self-reported data which found that among 177,047 adults in the US, both males and females who were overweight were more likely to experience anxiety than people who are non-obese. Specifically, those who had  $BMI \geq 40$  were 42 *per cent* more likely to experience a diagnosis of anxiety. Moreover, Anderson *et al.* (2007) followed a sample of 701 young people over 20 years and found that females who were obese in adolescence were four times more likely to experience an anxiety disorder in adulthood compared to those of healthy weight.

In contrast, a meta-analysis of 13 correlation studies investigating the relationship between adult obesity and anxiety found no significant relationship (Garipey *et al.*, 2010). These studies gathered data from US, Canada, and Europe. The odds ratio was 1.4 and there was a high inconsistency index of 84.3 *per cent* which indicates there was heterogeneity between the 13 studies that were combined (Garipey *et al.*, 2010). The odds ratio reported therein is in fact strikingly similar to that reported by Scott *et al.* (2008) although on this occasion were not significant. Arguably, the limitations of this research may have impacted on the conclusions drawn from the results. For example, there were different anxiety inventories which lead to various degrees of anxiety being diagnosed some referred to current anxiety or to lifetime anxiety and there was a variation in the types of anxiety disorders included in studies. Furthermore, there was inconsistency in the ways that researchers measured BMI, so whilst some directly measured heights and weights, others based their analyses on self-reports.

In summary, there is some evidence that both depression and anxiety are associated with obesity, with more consistent findings for the former than the latter. There is further evidence that depression might be a risk factor for later obesity although the mechanism by which this occurs is currently unclear. Why emotional distress may be associated with obesity is discussed in later sections.

### **1.3 The impact of energy imbalance on obesity**

As discussed, there are significant medical and psychological problems that are associated with obesity which contribute to individuals in society becoming more physically and perhaps emotionally unhealthy. There are a variety of causes of obesity, most of which are related to the way in which people choose to live their lives (i.e. lifestyle factors). This section will review literature on the notion that obesity originates from an energy imbalance where energy intake exceeds energy expenditure. More specifically, UK and Scottish data will be discussed to illustrate how the energy imbalance is occurring in the UK.

It is important to highlight the fact that children's energy requirements are different from adults. The reason that children's energy requirement is different from adults is that they still require energy to grow and develop as well as energy to be active. Ordinarily, children need their energy intake to be greater than the energy out but of course if the energy obtained from their diet is in excess of what they need to be active and to grow, then they will begin to put on weight. This is not the case for adults, who require only enough energy to be active and, therefore, they need their energy intake to match their energy expenditure to prevent weight gain (SIGN, 2010).

### 1.3.1 Energy intake

Current evidence suggests that high energy intake and low energy expenditure might be the dominant factors that contribute to obesity. However, there is no consensus from the research on whether energy intake or energy expenditure is the main determinant of obesity (Bleich *et al.*, 2011). A literature review conducted between 1970 and January 2010 found 27 studies that evaluated the relationship of energy intake or energy expenditure to weight gain in US with children aged between 2 and 19 years (Bleich *et al.*, 2011). The authors stated that the studies were heterogeneous which prevented them from conducting quantitative analysis of the research therefore this review was limited to qualitative description of the data. They reported two longitudinal studies and eight cross-sectional studies that found that higher energy intake was related to higher BMI whereas they also found three longitudinal studies and eight cross-sectional studies that found that lower energy expenditure was significantly related to higher BMI. Also, two longitudinal studies and two cross-sectional studies found that both energy intake and energy expenditure was related to higher BMI (Bleich *et al.*, 2011).

More specifically, evidence suggests that overweight children are eating a higher calorie diet than non-obese. For example, in Hui *et al.*'s (2003) study of 333 Hong Kong Chinese children aged between 6 and 7 years old, 38.2 *per cent* were overweight and 61.8 *per cent* were non-obese. They found that children who ate more than 1600 kcal/day were 2.3 times more likely to be overweight than those who ate less than 1200 kcal/day. A study of 181 Canadian children aged between 4 and



16 years old found that obese children ate significantly more calories than non-obese (Gillis *et al.*, 2002). Similarly, Aeberli *et al.*'s (2007) study of Swiss children who were aged between 6 and 14 years old found that overweight children consumed 7.7 g more protein and 27.9 g more meat than non-obese children. The authors concluded that increased protein may be linked to higher energy intake which has been associated with obesity. Other studies have found similar results (Stunkard & Waxman, 1980; Swinburn *et al.*, 2009). The limitations of these findings are that dietary intake was self-reported, the sample sizes are small and there are variations in the categorisation of overweight and obesity which impacts on the suitability of comparing these studies.

Furthermore, it appears that children's consumption of high energy drinks influences their weight through perhaps increasing their energy intake. In particular, Welsh *et al.*'s (2005) longitudinal US study of a large sample of children aged between 2 and 3 found that overweight children were 1.8 times more likely to remain overweight ( $\text{BMI} \geq 95^{\text{th}}$  percentile) when they drank more than three soft drinks per day compared to those who drank less than one per day. Other researchers have found similar results (Butte *et al.*, 2007; Dennis *et al.*, 2009; James *et al.*, 2004; James & Kerr, 2005; Ludwig *et al.*, 2001; Malik *et al.*, 2006; Vartanian *et al.*, 2007). The limitations of current research are that some studies have a conflict of interest in respect of who is providing the funding of the research, differences in effect size and that the data were collected by self-reports which may underestimate the consumption.

There is some contrasting evidence that indicates that energy intake is lower for overweight adolescents and children compared to those who are not overweight (Rocandio *et al.*, 2001). For example, a study of 512 adolescents children (131 of the sample categorised as overweight or obese, BMI  $\leq 25$  kg/m<sup>2</sup> at 18 years) aged 11 to 14 years found that the energy intake for overweight children (2269 $\pm$  900 kcal/day for boys, 1720 $\pm$  689 kcal/day for girls) showed they ate significantly fewer calories than non-overweight children (2465 $\pm$  858 kcal/day for boys, 2062 $\pm$  652 kcal/day for girls) (Hassapidou *et al.*, 2006). The contrast in findings from these studies and the above research might be explained by the different countries that the research was conducted in and the varied methods of collecting dietary information in respect of whether it was collected over one day, several days or a weekly record and whether dietary information was specific to soft drinks or other food types. It might be the case that the findings could be attributed to under reporting due to self-reporting of data.

### **1.3.2 Energy expenditure**

In general, it seems probable that the impact of high levels of energy through diet is only likely to facilitate weight gain if young people and adults do not engage in sufficient levels of activity to burn off these calories. As perhaps would be expected, research points towards the fact that obese adults and children not only consume greater levels of calories but they also engage in less physical activity and more sedentary behaviour than those who are non-obese. For example, a study of 2241 children from Greece who were between 1 and 5 years old found that children who

were engaging in three hours or more light to vigorous exercise per day were 4.2 times less likely to be obese (Manios *et al.*, 2009).

Other studies have found similar results. Abbot *et al.*'s (2001) study of 106 Australian non obese children aged between 6 and 9.6 years used an objective measure (doubly labelled water (DLW)) to assess total energy expenditure over 10 days and suggested that physical activity may explain obesity in boys only. The correlation analysis found that only boys' (N= 52) physical activity was significantly negatively associated with BMI (adjusted for age). The authors interpreted these findings that boys' physical activity possibly impacts on their weight whereas this may not be the case for girls. It was postulated that energy intake may have more of an effect on girls' weight than physical activity; however the authors did not measure this therefore were unable to investigate this further. It might be related to sex differences in how men and women manage increases in physical activity. A study investigating the impact of increased physical activity on energy balance and weight found that women increased their energy intake to counteract the increased physical activity more than men (Westerterp *et al.*, 1992). Albeit, this was with an adult population, these sex differences might be evident within children.

A strength of Abbot *et al.*'s (2001) study is that physical activity was measured by using objective measures rather than self-reports; however a limitation is that it was a small sample size and that the children were non-obese which may reflect an influence of physical activity on non-obese children rather than obese children. Other

researchers have also found similar results (Besson *et al.*, 2009; Ekelund *et al.*, 2002).

In addition to exploring the association between the amount of time engaging in physical activities and weight, some researchers have explored the impact of sedentary behaviours. Research has also demonstrated that the amount of time spent engaging in sedentary behaviours such as TV watching and playing computer games, has also been linked to childhood obesity (Bleich *et al.*, 2011). Marshall *et al.*'s (2004) meta-analysis evaluated 39 studies of 44,707 young people aged between 3 and 18 years and found that the fully corrected sample weighted mean effect size was .084 which suggests that body fatness and TV viewing are significantly related. These findings need to be viewed with caution as there was heterogeneity in the effects. This suggests that there is significant variability between the studies that was included in this meta-analysis such as differences in characteristics of the sample and variations in design which limits the ability to draw firm conclusions. The variation in findings from current literature regarding energy output being related to childhood obesity might be explained by the large variation in the study designs such as age of participants, country conducted in and the varied methods used to measure physical activity and sedentary behaviour.

There is some research that points towards energy imbalance being a plausible explanation to childhood obesity. If this was the case, the types of food children are

eating and the level of physical activity they are engaging in are potential contributing factors to childhood obesity.

It appears that the types of foods that children are consuming in the UK are becoming healthier and this might be slowly reducing the overall energy intake. For example, the Department of Health (DoH) (2010) UK national diet and nutrition survey revealed that from a four day self-report food diary for 1095 children between the ages of 1 and a half and 18 years there was an improvement in the number of healthy foods children consumed. This suggests their diet was improving when comparisons are made between the 2008/2009 survey and an earlier one also conducted by the Department of Health (DoH, 2000). It was found that the mean consumption of fish per day increased from 15g to 20g (34 *per cent* increase), vegetable consumption increased from 23 to 35g a day (30 *per cent* increase) whilst there was a decrease from 30g to 18g per day (39 *per cent* decrease) in sugar, confectionery and snacks. Like nearly all data in this field, both these surveys' findings are based on self-reports so we can never be entirely sure of the accuracy; the sample size is reasonably large, however a large sample size does not necessarily ensure the results are accurate.

Currently, it appears that Scottish children are eating more healthy foods and less unhealthy foods compared to 2003. For example, the Scottish Executive (2009) compared the frequency that children ate certain foods in the 2003 survey of 3324 children to the 2008/2009 survey of 16,754 children. It was found that the

consumption of chocolate, daily biscuits, non-diet soft drinks intake and crisps reduced while there was an increase on a weekly basis in the consumption of two or more slices of bread, potatoes, rice or pasta and oily fish. However, it was found that only 14 *per cent* of children aged between 5 to 15 years consumed the recommended daily fruit and vegetable consumption of five a day (Scottish Executive, 2009). As previously mentioned, this large scale data collection is limited by the self-report methodology.

It would appear that diet in the UK and in particular Scotland is starting to improve in that the frequency of healthy and unhealthy foods being eaten is changing. However, this does not seem to be having an effect on childhood obesity as yet. This change may take some time to have a significant effect on children's weight. Perhaps more changes need to occur in energy intake or other society changes such as reducing the amount of television advertisements for sweet and fatty foods on children's channels (Government Office for Science, 2007), reducing the ratio of high energy dense foods to low energy dense foods available in supermarkets and continuing to improve labelling of products (Scottish Executive, 2010). These, alongside a change in energy intake, are required to have an impact on the prevalence of childhood obesity.

As well as diet impacting on current rates of obesity in Scotland the low level of physical activity is also a contributing factor to the rise in obesity. This is in-keeping with the general notion that it is the imbalance between energy consumption and

output that may lie at the heart of the cause of obesity. It appears that many people in Scotland are also not meeting the recommended level of activity as well as not eating the advised daily intake of fruit and vegetables. For example, the Scottish Executive (2009) reported that only 37 *per cent* of adults were meeting the Scottish Government recommendation of 30 minutes moderate exercise a day and 65 *per cent* of children were meeting the recommendation of at least one hour of daily physical activity (Scottish Executive 2003). These figures indicate that currently Scottish residents are not as active as they could be and this perhaps is having an impact on the overall energy imbalance of Scotland.

#### **1.4 Treatments for obesity**

The aim of this section is to discuss the treatment approaches used with young people who are obese and their effectiveness. This is relevant to this study as it is important to evaluate what is effective and what needs to be further explored to provide successful interventions to help reduce the prevalence of childhood obesity. There have been a number of studies over recent years that have investigated the impact of increasing physical activity, improving diet, behavioural change and lifestyle interventions along with drug treatments for the severely obese. These will be discussed in the following paragraphs.

## Activity-Based Interventions

It appears that the amount of exercise that a treatment group engages in on a weekly basis impacts markedly on the amount of weight lost, perhaps unsurprisingly. Atlantis *et al.* (2006) conducted a meta-analysis of 14 random controlled studies (RCT's) of the impact on young people's weight of exercise-based interventions. They found that when high exercise studies were pooled together, treatment groups were involved in ( $156 \pm 25$  minutes) a week, the weighted mean difference was -4.9 kg ( $p = 0.01$ ) (Atlantis *et al.*, 2006). On the other hand, when the low exercise studies, ( $117 \pm 46$  minutes a week) were pooled together along with high exercise studies (i.e. when the authors combined all interventions regardless of the extent to which they encouraged increased activity levels) the weighted mean difference was not significant and reduced to -1.2 kg (Atlantis *et al.*, 2006). Their conclusions, which seem entirely sensible, are that the amount of increased activity directly impacts on whether and to what extent young people lose weight. The exact amount of exercise that must be conducted is however currently unknown and one would expect that this relates to the energy intake of young people anyway. Some of the inherent difficulties involved in pooling studies that are heterogeneous in methodology limit the findings that can be drawn such as that highlighted by Atlantis *et al.* (2006).

Furthermore, a meta-analysis of 18 studies concluded that school-based physical activity interventions did not improve BMI (Harris *et al.*, 2009). When the 12 random controlled trials (RCTs) were combined the change in BMI between the



treatment groups and controls was not significant with the weighted mean difference = 0.01 kg/m<sup>2</sup> square (Harris *et al.*, 2009). It appears that children who were engaged in exercise treatment groups at school did not lose more weight than those who did attend a physical activity programme. There were a range of limitations in this meta-analysis including the fact that there was no assessment of the amount of physical activity children were actually engaging in during the intervention period therefore there is the possibility that those who were assigned to the treatment groups did not engage in more exercise than the control.

Research indicates that interventions that aim only to increase physical activity have mixed results on reducing obesity. However, we need to be mindful that there are a range of complex issues in the literature on physical activity and obesity. These include the natural difficulty in measuring energy expenditure and the fact that many believe what is important here is that energy expenditure must outweigh the amount of energy obtained through food intake which is rarely measured alongside physical activity interventions (see section 1.3). This could be crucial because, for example, participants may indeed increase their activity levels but this may not be sufficient to compensate for their standard dietary intake, or they in fact simply engage in compensatory behaviours (i.e. consume more).

Scottish Intercollegiate Guidelines Network (SIGN) (2010) concluded from the review of the literature that increasing physical activity and reducing sedentary behaviour can have a positive impact on children's weight. They noted from current

evidence that there was no clear indication of the exact amount of physical activity children should engage in on a daily basis. However, SIGN (2010) recommended that children should aim to engage in 60 minutes of moderate activity each day and that sedentary behaviour (i.e. watching TV or playing computer games) should be restricted to two hours a day.

## **Diet-Based Interventions**

There is limited evidence that interventions based around manipulations of diet alone result in lasting weight reduction. Gibson *et al.* (2006) conducted a literature review which included seven randomised controlled trials conducted between 1966 and 2005 that evaluated weight loss in children and adolescents using dietary interventions (either energy restricted diets, reduced carbohydrate diets or low glycaemia index diets). They reported that this did result in reduced weight among overweight or obese young people compared to a comparison group (either a control group not given dietary intervention or a comparison group given a different dietary intervention). However, only two studies reported follow up data at 12 months and it was found that the weight reduction declined with follow up indicating that maintaining the weight loss is a problem and that diet interventions may impact on weight reduction in the short term. A limitation of their data is that there are few long term data to capture the long term benefits of diet alone interventions. Also, the data on food consumption were mainly self-reported which may have over emphasised the outcomes. Furthermore, the literature review findings are limited as they reported

qualitative descriptions of the evidence rather than using quantitative methods to pull data from several studies together.

In contrast, Ebbeling *et al.* (2006) found no difference between those (103 adolescents aged between 13 to 18 years old) who replaced their sugar sweetened beverages with non-calorie beverages compared to a control group. However, there was evidence that the intervention reduced BMI in those children with BMI greater than or equal to 30. The BMI reduction of those in the intervention group who had a BMI greater than or equal to 30 was significantly larger than the control group with a net difference of  $-0.75 \pm .34$  kg/m<sup>2</sup> (Ebbeling *et al.*, 2006) suggesting that the intervention targeted those most in need. However, a limitation of this study is that it only focused on one aspect of children's diet, soft drink consumption, and perhaps children had reduced their consumption but at the same time may have continued to eat an unhealthy diet which may explain the limited changes in their weight.

Part of the problem with evaluating the effect of manipulation of diet alone is that most studies report on complex interventions consisting of multiple components. For example, Collins *et al.* (2006) reviewed 37 RCTs of which eight studies were included in a meta-analysis that had adequate controls (262 participants in the treatment group and 284 in the control group) with participants under the age of 18. They noted that there were not sufficient RCTs to conduct a meta-analysis for diet only interventions. They did, however, report there was evidence to suggest that an intervention with a dietary component was effective. The pooled standardised mean

difference (SMD) was -1.82; the test for overall effect was significant however the test of heterogeneity was significant as well. These findings suggest that interventions that had a dietary component resulted in children losing weight. Caution is urged however when considering these results as the interventions were heterogeneous and multi-faceted, making it difficult to conclude which components of the interventions were most effective. Similar results have been reported from another systematic review that included 37 random controlled studies and 67 non-randomised controlled studies (Collins *et al.*, 2007). They also stated that the limitations of research on this topic are the heterogeneity of interventions used, the breadth of age ranges and typically small sample sizes.

Interventions which target diet alone are vulnerable to the same problems as interventions that focus on activity levels alone. Essentially, they are focusing on only one side of the energy equation. On the other hand, it seems that diet can be an important component in interventions for obesity, which makes intuitive sense.

## **Lifestyle Interventions**

There is some evidence to suggest that lifestyle interventions that target diet (energy in) and activity levels (energy out) along with behavioural change strategies and family support enable young people to make changes to their diet and physical activity which reduces their weight (Epstein *et al.*, 2007; Janicke *et al.*, 2008; Sacher *et al.*, 2010). In particular, a family-based programme in the US aiming to change

diet and physical activity with the use of behaviour strategies with children who were overweight aged between 8 and 16 found a significant reduction in BMI compared to a control group which was maintained over a year (Savoye *et al.*, 2007). The study found a significant mean difference in BMI between the intervention group and control at 12 months. The intervention group consisted of 105 participants who received 60 sessions over 12 months while the control group with 64 participants went to clinic twice over the same time period (Savoye *et al.*, 2007). One of limitations of this study is that the control group was not matched to the intervention group. Again, the research in this area is limited by the typical restraints of obesity evidence in respect of the differing definitions used to define overweight, short follow up data and limited reporting of compliance to interventions. Other researchers have reported the benefits of incorporating behaviour modification techniques along with family involvement to significantly reduce weight in young people (Epstein *et al.*, 1985; Senediak & Spence, 1985).

It is not surprising that interventions which have used behavioural strategies that are derived from a range of psychological theories and approaches appear to be effective in influencing behaviour change. It would be expected that if interventions are based on proven theories then it would be more likely that a reduction in weight would occur than if interventions were developed with no theoretical grounding. It has been frequently highlighted that interventions that aim to change health-related behaviours (such as activity levels; diet; smoking and so on) are significantly more successful if they are based on sound psychological models (rather than being ad-hoc). It is important that interventions that aim to help people change their behaviour consider

psychological principles and theories to help them implement behaviour strategies that match the behaviour they want to change to improve the chance of an individual's success (Michie *et al.*, 2008).

The behavioural strategies have been based on some of these theories for example; operant learning theory, behavioural therapy, cognitive behaviour therapy, theory of planned behaviour and social cognitive theory (Ajzen, 1991; Bandura, 1997; Ogden, 2004; Skinner, 1963). The behaviour techniques include: goal setting, action planning, relapse prevention, cost and benefits analysis, cognitive restructuring and reward incentives.

## **Pharmaceutical Interventions**

Along with efforts to help young people and adults lose weight by changing behaviour, researchers have also explored the effectiveness of medication and invasive procedures. Two recent meta-analyses have indicated that two medications, Sibutramine and Orlistat, along with behavioural support reduce adolescents' weight. Orlistat prevents fat absorption while Sibutramine enhances satiety and increases energy expenditure. Viner *et al.* (2010) conducted a meta-analysis on four studies between 1996 and 2008 and found that Sibutramine significantly reduced weight by 2.2kg compared to a placebo control group among young people aged 7 to 20.

The same meta-analysis only found two trials of Orlistat which included 573 adolescents and found that this medication along with behavioural strategies was significantly associated with greater weight loss, 0.83 kg compared to a placebo control group (Viner *et al.*, 2010). Similar results were found by Czernichow *et al.*'s (2009) meta-analysis which included eight studies, five Sibutramine and three Orlistat (1391 adolescents). These authors interpreted these findings to suggest that Sibutramine and Orlistat, along with behavioural strategies can reduce adolescents' weight.

The evidence consists of only two meta-analyses themselves based on only five studies of Orlistat and nine studies of Sibutramine and adverse reactions to these two drug treatments were reported, such as headaches and gastrointestinal side-effects. A further limitation is there may be a publication bias as all studies reported a weight reduction which might suggest only studies showing a significant result had been publicised. Perhaps the main issue is that these medications were not evaluated as single interventions, but rather were delivered along with behavioural support programmes. It is therefore not clear whether or not they are effective when delivered as a single treatment in routine clinical practice.

Currently there is no medication licensed for use in treating obesity with children in the UK (SIGN, 2010). However, in exceptional circumstances an evidence-based national clinical guideline (SIGN, 2010) recommends the use of Orlistat along with lifestyle intervention for adolescents who are severely obese or extremely obese (a

BMI greater than or equal to the 99.6 centile using the UK 1990 reference chart or BMI of 3.5 SDs above the UK 1990 reference chart) with co-morbidities and who are attending a specialist obesity clinic.

Czernichow *et al.* (2009) concluded from their review that obese adolescents could be considered for Orlistat or Sibutramine along with lifestyle interventions and National Institute for Clinical Excellence (NICE) (2006) stated that children over the age 12 could be considered for these medicines. However, NICE removed the recommendation of the use of Sibutramine after Medicines and Healthcare Products Regulatory Agency suspended the marketing authorisation on the 21 January 2010, due to evidence suggesting that there was an increased risk of non-fatal heart attacks and strokes. In considering the use of these drugs it was advised to consider the significant side-effects of Orlistat which are mainly related to the gastrointestinal tract such as oily stools, increased defecation, cramp and abdominal pain, whereas the side effects of Sibutramine can include increased blood pressure, dizziness, and constipation (Czernichow *et al.*, 2009).

In addition, adolescents who are severely obese with severe co-morbidities that are past puberty can be considered for bariatric surgery (SIGN, 2010), although this is currently rarely conducted in the UK. There is some evidence that suggests that bariatric surgery is effective for adolescents losing weight. For example, Treadwell *et al.*'s (2008) meta-analysis of 18 studies of 641 young people aged between 9 and 21 years (mean age 16.8 years) found that there was a clinically significant weight loss.



However, the authors concluded there was limited evidence on the impact on obesity associated co-morbidities and quality of life. There were some complications reported from the reviewed studies such as band erosion, wound infection and postoperative bleeding. Furthermore, Whitlock *et al.*'s (2008) systematic review identified 18 case series which the authors evaluated as fair or poor quality. According to Whitlock *et al.* (2008), bariatric surgery for young people who are severely obese leads to weight loss in the short term. However, there is limited research that has evaluated the long term consequences of bariatric surgery: whether this treatment improves young people's wellbeing requires further evaluation.

In summary, there is limited evidence for any standalone intervention. The literature seems to suggest that almost certainly, more successful treatments will be multifaceted. It is therefore perhaps not surprising that on reviewing the entire literature, both NICE (2006) and SIGN (2010) recommended lifestyle interventions for the treatment of obesity in children and adolescents in the first instance. They both advise that treatment should be family based with at least one parent involved and that behaviour change components should be included. They further advise that the overall aim of the treatment should be a family-wide change in diet and physical activity levels. In extreme circumstances, where adolescents have severe obesity and co-morbidities (and when other treatments have failed), guidelines advise clinicians to consider pharmaceutical and invasive interventions such as Orlistat and bariatric surgery.

## **1.5 Parenting style and obesity**

The epidemic of obesity is perhaps stabilising and there are some significant health conditions that are related to childhood obesity. Therefore, it is paramount that research continues to develop the evidence on which is the best to reduce the prevalence of obesity. Overall, it appears that lifestyle interventions that address the energy imbalance through diet and physical activity are promising treatments using behavioural techniques along with family involvement. There is some evidence that complex interventions can reduce childhood weight, however maintaining this in the long term is problematic. As these interventions have been evaluated as a whole it is currently difficult to state which parts are the most effective.

This thesis will explore one component of obesity interventions, parenting, to further investigate whether there is a relationship between parenting and childhood obesity. It would be as relevant to explore behavioural change techniques, diet alone, activity alone and pharmacological interventions, however, this is outside the remit of this thesis. To begin to review the influence of parenting on childhood obesity the following section will provide a brief overview of parenting style and then discuss the current research that relates to parenting style and obesity.

### **1.5.1 Parenting style**

The term "parenting style" provides a description about how parents socialise their children. In this context socialising means how parents expect their children to

integrate into society and how parents respond to their children's needs. Specifically, the parenting style model which is widely referred to throughout the literature on families parenting and children's behaviour was developed by Baumrind (1966). This approach incorporated parental emotional and behavioural responses involved in the socialisation process. Parenting style includes references to parenting practices and parents' values both of which are hypothesised to influence the effectiveness of the parents to socialise their children into the family-life and the wider community (Baumrind, 1967; Baumrind, 1971a; Baumrind 1971b; Darling & Stenberg, 1993). The ability of parents to socialise their children is related to parental control strategies according to Baumrind (1966), and this in turn directly influences how well children are socialised into their environment.

Parenting style is categorised using three different descriptions of parental control strategies instead of the previously used and more simplistic dichotomy of high or low parental control. Baumrind (1978) argued that parents can be categorised as authoritative, authoritarian and permissive. The author used a configuration approach where each parenting style was based on different patterns of parental control along with differences in parents' communication style, their use of nurturance and maturity demands (Baumrind, 1965; Baumrind, 1967; Baumrind & Black, 1967).

Authoritative parents are characterised by their ability to achieve a balance between being demanding (of age-appropriate behaviours) and responsive (to their children's

emotional needs). Furthermore, they tend to be supportive and assertive rather than punitive (Baumrind, 1965; Baumrind, 1967; Baumrind & Black, 1967). Parents described as authoritative promote high psychological autonomy and display firm control. Authoritative parents would encourage democratic discussion, be clear with their communication of expectations and provide reasoning behind the demands they place on their children. They can be regarded as being high in behavioural control and low in psychological control. On the other hand, authoritarian parents place high demands on their children (which are not necessarily age-appropriate) and they are directive but not responsive or warm. They are generally seen as strict, expect their rules to be obeyed and provide no explanation why this should be the case. These parents are high in psychological and behavioural control; that is they are often characterised as very controlling of their children.

Permissive parents in many ways exhibit the opposite characteristics of authoritarian ones. They are generally non directive, moderate in their responsiveness to their children's emotional needs and tend to avoid confrontation. Permissive parents' expectations of mature behaviour are limited and they are often described as being lenient. It was noted by Baumrind (1967) that parents who were non-authoritative communicated less effectively, less maturity demands were made and they were less nurturing towards their child than authoritative parents. They can be seen as being low in psychological and behavioural control.

### 1.5.2 Parenting style related to child outcomes

Parenting style has been continually implicated in a wide variety of developmental and behavioural aspects of the lives of young people. Authoritative parenting has generally been associated with positive outcomes for young people. For example, adolescents who rated their parents to be authoritative were considered to be more socially responsible (Baumrind, 1991). Furthermore, Lamborn *et al.* (1991) found adolescents who rated their parents as authoritative had significantly higher levels of academic competence, psychosocial development and lower levels of problem behaviour compared to adolescents from authoritarian, neglectful and indulgent families. A strength of this study was a large sample size consisting of 4100 adolescents between the ages of 14 and 18 years. A limitation of this study is that data were only collected from one source (i.e. adolescents).

Authoritative parenting has also been associated with higher school achievements and engagement with schooling compared to permissive and authoritarian parenting (Steinberg *et al.*, 1992; Turner *et al.*, 2009). Research indicates that authoritative parents have children who are socially competent and who are high achievers at school: there has also been a suggestion that authoritative parenting has been linked to children's emotional well-being. In particular, an adolescent sample of 14 to 16 year olds which used parental reports for parenting style found that authoritative parenting style was significantly negatively associated with depression while authoritarian was significantly positively related to depression (Hardeep-Lai *et al.*, 2009). Furthermore, authoritative parenting style was associated with fewer

depression symptoms during adolescence and this continued at the four-year follow-up (Liem *et al.*, 2010).

Moreover, research investigating internalising behaviour of children has also found similar results in that there is some evidence that authoritative parenting style has been associated with less internalising of problems. A longitudinal study from 14 months to 15 years old found authoritative parenting style was significantly associated with a less internalising problem behaviour while permissive parenting style was associated with higher internalizing problems at pre-school (Williams *et al.*, 2009). They found that parenting style did not influence the increase in behaviour problems over time. It was suggested by the authors that childhood outcomes might depend jointly on the effects of parenting and the child's temperament. This study was unable to evaluate this as parenting style was only measured at age seven rather than at age 4 months and onwards. Previous research has also indicated that the impact of parenting on children's behaviour might also be influenced by the child's characteristics, however it has been difficult to establish which has the most influence as the child and parent relationship is dynamic (Propper & Moore, 2006; Williams *et al.*, 2008; Wood *et al.*, 2003).

There is limited research to understand the processes that relate parenting style and child development. Therefore it is unknown exactly what aspects of different parenting styles are most influential in positive or negative outcomes for young people.

### 1.5.3 Parenting style related to weight

As parenting style appears to be related to children's outcomes in a number of ways (in particular their behaviour and their emotional wellbeing), it seems plausible that it is also related to children's weight (which is directly related to behaviours associated with activity and diet). Indeed, there is some evidence to indicate that parenting style is related to weight, although this is equivocal.

Ventura and Birch (2008) conducted a review of seven studies and concluded that there was mixed evidence that parenting style and weight were associated. Four studies used general parenting style as described by the Baumrind model while three studies used a narrow definition of parenting style related to feeding behaviours. The feeding specific parenting style states that parents use specific styles, parenting practices and attitudes to socialise their children during feeding situations and these are categorised as authoritative, authoritarian and permissive feeding parenting style (Hughes *et al.*, 2005). The review concluded that five studies (only one was a longitudinal design) had found significant relationships indicating that authoritarian and permissive parenting styles were associated with higher children's BMI than authoritative (Ventura & Birch, 2008). In contrast, they found two studies that did not find any significant relationships between parenting style and children's weight. One of these studies used the small sample size of 49 boys only which may have limited their findings (Brann & Skinner, 2005). The authors of this review suggest that parenting style may predict weight however due to the evidence being mainly based on cross-sectional data and one longitudinal study they concluded that there is

insufficient evidence to determine whether parenting influences child weight or the children's weight influences the parenting style adopted by parents.

Limitations of this review include a minimal description of how the review was conducted and that the analysis was based on qualitative rather than a quantitative statistical summary of integrating research, bringing into question the accuracy of the review's findings. This review revealed that research relating to parenting style and weight has mainly been conducted using a cross-sectional design which limits the ability to conclude the direction of the relationship found. Furthermore, there is a lack of consistency about the definition of parenting style and validation of measures for this construct. Also the authors reported that many studies did not distinguish between parenting style and parenting practices which again makes it difficult to conclude that differences in findings are due to variables measured rather than methodology discrepancies between studies.

Research suggests that permissive parenting style is related to greater weight. A study of 718 caregivers of children aged 3 to 5 years reported that permissive parenting styles related positively to children's weight (Hughes *et al.*, 2008). Furthermore, a study using the parenting dimensions of nurturance and control to define parenting style based on Maccoby and Martin (1983) instead of Baumrind's definition using the dimensions of responsiveness and demandingness to define the parenting style found indulgent mothers (defined as high nurturance & low control, similarly to permissive parenting style) were more likely to have children who had



become overweight at three years follow up (Olvera & Power, 2010). This study was conducted with 80 Mexican American mothers and their children aged between 4 and 7 years old.

Perhaps contrary to expectations, some research has shown that fathers' permissive parenting, not mothers' is a risk factor to children being overweight (Wake *et al.*, 2007). Arguably, more surprisingly is the fact that these studies have mainly been conducted with children of pre-school age when most care-giving is done by mothers. The limited age range does limit the extent to which the findings can be generalised to older young people.

Conversely, there is some evidence that it is maternal rather than paternal parenting style that is related to children's weight. For example, a five year longitudinal study of 2516 adolescents whose mean age at time one was 12.8 years old and at a five year follow up their mean age was 17.2 years found that maternal parenting style predicted both siblings' BMI at follow up (Berge *et al.*, 2010). More specifically, maternal authoritative parenting style predicted lower BMI and an authoritarian parenting style predicted higher BMI among sons at five-year follow-up. In addition, maternal authoritative parenting style predicted a lower BMI and maternal neglectful parenting style predicted higher BMI among daughters at the five-year follow-up. Whereas, there was no significant association found between paternal parenting style and BMI, these findings suggest that parents who are warm, supportive, demanding and responsive promote a lower BMI among girls and boys (Berge *et al.*, 2010).

Also, it seems that parents who are highly controlling, directive and not responsive contribute to a higher BMI among sons. The findings also indicate that parents who are non-responsive and place low demands on their daughters may contribute to higher BMI in daughters.

In contrast to previous findings, it appears from Berge *et al.*'s (2010) study that paternal parenting style does not influence adolescent BMI. Some of the limitations of this study are that BMI was self-reported at both time points which may have resulted in inaccurate reporting and parenting style was defined through the use of three questions relating to parent responsiveness and the level that parents' place demands on their children rather than a standardised parenting style questionnaire. However, the study was based on a large sample size, used a longitudinal design and evaluated the impact of paternal and maternal parenting style on BMI.

Rhee *et al.*'s (2006) study also indicates maternal parenting style is related to BMI. They found in a sample of 842 preschool age children who had authoritarian mothers they were five times more likely to be overweight than children who had an authoritative mother. Furthermore, they found that authoritarian mothers had the highest amount of children who are overweight at 17.1 *per cent* compared to neglectful mothers, 9.9 *per cent*; permissive mothers, 9.8 *per cent*; and authoritative mothers 3.9 *per cent*. In contrast, Blissett and Haycraft (2008) found no significant relationship between maternal or paternal parenting style and children's weight in children aged between 2 and 5 years. Forty eight mothers and forty eight fathers

reported on their own parenting style. They conducted a Pearson correlation and found that maternal and paternal parenting style was not significantly related to children's BMI. This study had a small sample size which may have reduced its power to find an effect. Also, Brann and Skinner (2005) found that both maternal and paternal parenting styles were unrelated to boys' weight. This study compared overweight boys aged between 8 to 10 years old with their peers who were not overweight. The limitations of these studies were that both studies were based on a small sample size while one study only investigated the relationship between boys' weight and parenting style.

Age effects might be contributing to the research findings on parenting style being related to young people's weight, as the various studies discussed above have referred to young people ranging from preschool age up to adolescence. Current research conducted with preschool and primary school aged children suggested that permissive parenting style is positively associated with children's weight (Huges *et al.*, 2008; Olvera & Power, 2010).

Furthermore, the current research is at the early stages of understanding about the influence of mother and father parenting style on children's weight, whereby there is a continuing debate about this. There is some evidence that suggests there is no association amongst children who are preschool and primary school age (Blisset & Haycraft, 2008; Branan & Skinner, 2005) whereas Wake *et al.*'s (2007) findings indicated that fathers permissive parenting style is more of a risk factor of children

being overweight who are preschool age. In contrast, Berge *et al.*'s (2010) study of adolescence found that maternal rather than paternal parenting style predicted young people's weight. In support of these findings, Rhee *et al.*'s (2006) study with primary school aged children also found that authoritarian mothers were more likely to have children that were overweight. It might be the case that maternal and paternal parenting styles influence young people's weight at different ages however currently there is no obvious pattern. Albeit, some of the differences in current research findings could be contributed to each individual studies limitations, which have been discussed previously in this section, rather than the age of the children that were studied.

Overall, research indicates that authoritative parenting style may be protective against weight gain in children and that authoritarian and permissive parenting style may be associated with children being overweight; however findings are inconsistent. Furthermore, there is some evidence that maternal parenting style might be protective against weight gain.

## **1.6 Emotion Regulation**

Research suggests that parenting contributes to children's emotional wellbeing, their ability to regulate their emotions and their behaviours that influence their weight. This thesis will evaluate young peoples' emotional regulation abilities to evaluate if

this is also a contributing factor to their weight. To begin with there will be a general discussion on emotion regulation and then this will be related to eating.

Research into the area of emotional regulation has evolved from psychodynamic theories (Freud, 1946) and psychological theories of stress and coping (Lazarus & Folkman, 1984). It has been suggested by Gross (1999) that emotion regulation can be considered as a subcategory of coping. The reason that coping is seen as a broader concept is due to the fact that attempts to cope can be attempts to emotionally regulate, but the target can also be non-emotional components of experience (Gross, 1999). The term emotion regulation refers to the process:

*“... by which individuals influence which emotions they have, when they have them and how they experience and express these emotions. Emotion regulatory processes may be automatic or controlled, conscious or unconscious and may have their effects at one or more points in the emotion generative process” (Gross, 1998, p.275).*

A process model of emotion regulation was proposed by Gross (1998) to illustrate how individuals may attempt to regulate their emotions. The emotion generative process is triggered by an internal or external event that is subjectively important to an individual and then this will trigger an emotional response which the individual may express or they may not. The process model is described as a continuous timeline and at various points emotions can be regulated either by antecedent strategies (used before the emotion has been generated) or response focused strategies (employed to manage emotions after they have been generated) to regulate the emotional experience.

If an emotion is allowed to be generated it can influence an individual to focus on the here and now (attend to the situation that triggered the emotion) and distract from the long term goal and they may fail to self-regulate (Baumeister & Heatherton, 1996). For example, if a person is verbally abusive towards another an individual, then the individual being attacked may become angry and this emotion may lead them to act in a violent way and focus on winning the conflict no matter what the cost and not consider the long-term consequences. This is an example of a response focused external dysfunctional emotion regulation strategy.

The concept of emotion regulation is often embedded in modern psychological views of a range of clinical issues such as depression and anxiety (Cooper *et al.*, 2004). For example, from a cognitive behaviour therapy perspective the targets of therapeutic interventions when treating anxiety disorders are often safety behaviours which are conceptualised as dysfunctional attempts to regulate uncomfortable emotions. An example of an unhelpful internal regulation strategy is thought-blocking (because this makes the unwanted intrusive thoughts occur more frequently) (Wegner *et al.*, 1987) whereas deliberately avoiding feared-environments would be categorised as a dysfunctional external strategy (because this does not offer the opportunity for individuals to learn that they have the ability to cope in situations that make them experience uncomfortable emotions). Other examples of individuals' attempting to regulate negative affect are by engaging in smoking, drinking or drug taking (which are considered dysfunctional external regulation strategies) (Baumeister & Heatherton, 1996; Baumeister *et al.*, 1994). Typically during psychological therapy,

clinical psychologists are teaching and encouraging people to use functional (or helpful) internal and external regulation strategies.

Dysfunctional or functional efforts to regulate emotions are likely to play at least some role in people's dietary habits. For example, there is research indicating an association between depression and obesity, and it may be the case that, for some, "comfort eating" (a dysfunctional external method of coping with difficult emotions) contributes to their weight problem. Similarly, the bingeing associated with binge eating disorders and bulimia nervosa has been conceptualised as dysfunctional attempts to self-regulate intense negative emotions, as has the purging associated with the latter (Heatherton & Baumeister, 1991).

## **1.7 Emotional eating**

There are many consequences that can occur when an individual does not successfully regulate their emotions. The following section will review the literature that has focused on emotional eating and how this may impact on an individual's weight.

Emotional eating refers to an individual eating excessively due to negative emotion (Thayer, 2001). Thayer (2001) noted that symptoms of negative mood such as anxiety and depression can trigger an individual to eat in response to these emotions

which is termed emotional eating. Thus, emotional eating refers to a process where individuals use food to self-regulate their mood.

### **1.7.1 Theory of emotional eating**

The theories that contribute to our understanding of emotional eating are psychosomatic theory and theory of stress induced eating. The psychosomatic theory states that obesity might be the result of eating in excess to manage negative affects such as depression, anxiety and boredom (Kaplan & Kaplan, 1957). This perspective proposes that food is used to reduce negative emotions (Kaplan & Kaplan, 1957). Stress induced theory states that individuals overeat in response to stress and the extent of the overeating depends on individual differences (Bruch, 1973).

### **1.7.2 Emotional eating related to weight**

There is limited research that indicates that emotional eating is related to BMI and obesity (Konttinen *et al.*, 2010; Wardle *et al.*, 1992). For example, a study of 406 British children aged between 7 and 12 years old found that overweight and obese children engaged in more emotional eating compared to non-obese children (Webber *et al.*, 2009). Furthermore, a study of 292 Belgium children aged 9 to 12 years found obese children had significantly higher emotional eating compared to non-obese children (Braet & Van Strien, 1997). In support of these findings, a large study of 1342 Dutch participants with 200 participants under the age of 20, found that those who were overweight were significantly more likely to emotional eat (Van Strien *et*



*al.*, 2009). They also found that overweight ( $BMI \geq 25$ ) participants had significantly higher scores on emotional eating compared to non-obese ( $BMI < 25$ ) participants. Therefore, this evidence suggests that obese children and adults eat in response to negative mood more than non-obese children. It would appear to be the case that obese individuals may have learned to manage unpleasant emotions through comfort eating (this can be described as an avoidance coping/ external dysfunctional strategy) (Heatheron & Baumeister, 1991). This has negative consequences on their weight whereas non obese individuals are perhaps using functional external and internal emotional regulation strategies and do not need to eat to manage uncomfortable emotions. These studies used varied methods of defining obesity and were cross sectional, resulting in it being difficult to establish whether emotional eating leads to obesity. Furthermore, the evidence is limited to children and adults' rather than adolescents' which limits the ability to generalise these findings.

Contrasting evidence to the above findings has been reported. For example, a study of 220 overweight ( $BMI \geq 25$ ) adults who were seeking treatment for binge eating disorders found no association between emotional eating and BMI (Masheb & Grilo, 2006). This study measured five specific negative emotions rather negative effects as a general concept which did not allow participants to record when they ate in response to a combination of emotions. The Emotional Overeating Questionnaire (Masheb & Grilo, 2006) requested participants to recall the number of days over the previous 28 days they had overeaten in response to five negative emotions which depends on the accuracy of participants' retrospective memory. The use of ecological momentary assessment is more reliable as it requires participants to recall

information over specific set periods over a day using a diary format (Moskowitz & Young, 2006). Another limitation is that this method of assessment does not allow for participants to comment when they are eating in response to a variety of emotions.

Research also suggests that emotional eating is related to food consumption. For example, Kontinen *et al.* (2010) found that emotional eating was related to a high intake of sweet foods within a sample of 3714 Finnish adults. Specifically, they found that weekly sweet foods consumption was significantly positively related to emotional eating for men and women. Similarly, a large study of 10,087 Dutch adolescents aged 11-16 years old found that those high in emotional eating ate more snacks than those who scored low on emotional eating (Snoek *et al.*, 2006). One of the limitations of these findings is that the measure for food consumption was self-reported which may bring into question the accuracy of data reported and again these findings were based on cross sectional analysis.

In view of these findings, it appears that emotional eating is a contributing factor to obesity. Also, limited evidence has indicated that emotional eating is related to food consumption, which may in part explain the relationship between emotional eating and obesity although this has not been investigated as far as the author is aware. It still remains unclear how much of an impact emotional eating has on children becoming obese due to methodological limitations.

### 1.7.3 Emotional eating related to emotional problems

Researchers have proposed that emotional eating is related to anxiety and depression amongst primary and secondary school aged young people who are overweight. Goossens *et al.* (2009) found in a study of 188 overweight children aged 8 to 18 years that emotional eating was significantly associated with anxiety and depression. Furthermore, they found that emotional eating mediated the relationship between loss of control and anxiety (Goossens *et al.*, 2009). They propose that emotional eating was a method to reduce arousal in anxiety whereas in depression emotional eating was used to perhaps promote positive emotions to manage depressive symptoms (Goossens *et al.*, 2009). These findings need to be viewed along with the limitations of this study, based on cross sectional analysis and a small sample size.

Research also suggests that emotional eating is associated with stress rather than depression and anxiety amongst secondary school aged young people. In a study of 666 non obese adolescents aged between 11-15 years emotional eating was significantly associated with stress (Nguyen-Rodriguez *et al.*, 2009). This study did not measure adolescents' weight however in the analysis weight concerns were included. In contrast, the findings indicated that emotional eating was not related to depressed mood and anxiety. The researchers suggested that the association of negative mood and emotional eating might only be specific to adults eating rather than teenagers and perhaps that teenagers eat in response to stress instead (as previously discussed above). This study had an unbalanced sample of mainly females (74 *per cent*). This may have influenced the overall findings of this study.

Furthermore, it has been suggested that internal dysfunctional emotional regulation strategies mediate the relationship between stress and binge eating among adults. For example, Sulkowskia *et al.*'s (2011) study in the US of 147 female psychology undergraduate students aged between 18 and 25 years found that emotional coping (rumination and blaming oneself) partially mediated the relationship between stress and binge eating. This indicates that some individuals who are experiencing stress are more likely to use dysfunctional emotional coping strategies and will binge eat to manage their stress (Sulkowskia *et al.*, 2011). One of the limitations of this study is that these findings are based on a non-clinical female sample which limits the generalisation to a clinical population and that clinical symptoms were not assessed.

It has been proposed by Heatherton and Baumesiter (1991) that binge eating is a coping method to escape the negative emotions that are triggered from an individual's perception of self as failing to meet their exceptional high standards in their personal lives. Some evidence suggests that negative emotions such as sadness and anxiety are triggers for those who are overweight to eat and that difficulty identifying feelings may explain this link (Goossens *et al.*, 2009; Ouwens *et al.*, 2009). It has been suggested that binge episodes may not reduce negative emotions and are just changing the negative emotion to less aversive feelings. For example, a study of 95 obese binge eating women found that anger, depression and anxiety were more distressing than guilt compared to controls (65 non binge eating controls) (Kenardy *et al.*, 1996). It was proposed by the authors that the least uncomfortable emotion, guilt, (which is often the emotion that is reported to occur after a binge eating episode) is more bearable than the most uncomfortable emotions such as

anxiety (which often occur before a binge eating episode) (Arnow *et al.*, 1992). This indicates that individuals are attempting to manage negative affects through the use of binge eating in an attempt to reduce the negative emotion. The evidence suggests that this emotional regulation strategy is ineffective at managing unpleasant emotions albeit it may reduce the most uncomfortable emotion.

There is some mixed evidence about the impact that binge eating has on the intensity of emotions experienced before, during and after an episode amongst adults. During a binge eating episode it has been suggested that individuals experience a reduction in the negative emotion temporarily (Crowther *et al.*, 2001; Freeman & Gill, 2004; Heatherton & Baumesiter, 1991). However, some research found no change in emotional state 30-60 minutes before or after a binge episode amongst college students (Wegner *et al.*, 2002). A meta-analysis of 16 experimental studies of adults that induced negative mood and measured calorie intake in the laboratory did not find that negative mood increased calorie intake (Stice *et al.*, 2002). However, studies that allowed participants to eat during the negative mood induction found a significant higher effect on the amount of food eaten compared to studies that allowed participants to eat after the negative mood induction (mean effect size = -.01) (Stice *et al.*, 2002). It might be the case that the intensity of the negative effect is at the greatest during the experience of that emotion rather than after it has been triggered and it would seem likely that individuals who have learned to manage their emotions by eating would attempt to eat during this period.

There is mixed evidence on emotional eating being related to anxiety and depression amongst overweight adolescents and primary school aged young people (Goossens *et al.*, 2009; Nguyen-Rodriguez *et al.*, 2009). It might be the case that emotional eating is related to stress rather than anxiety and depression for adolescents who are overweight (Nguyen-Rodriguez *et al.*, 2009). It would seem that there is an agreement amongst adult literature that binge eating is an attempt to manage negative emotions (Heatherton & Baumesiter, 1991; Sulkowskia *et al.*, 2011 ) and there continues to be a debate about the impact of binge eating on the emotional experience amongst adults (Crowther *et al.*, 2001; Freeman & Gill, 2004; Heatherton & Baumesiter, 1991; Stice *et al.*, 2002; Wegner *et al.*, 2002). This is required to be explored further to evaluate young people's experiences.

Caution needs to be taken when interpreting the above discussed research as some evidence has been specifically related to those who are overweight while other data has referred to non-obese participants. Furthermore, these findings are from a variety of age ranges which makes it difficult to indicate if the suggested relationship between emotional eating and psychological problems is specific to children, adolescents or adults or if this applies across the lifespan. In addition, some studies have focused only on females or have a large proportion of females in their sample resulting in sample bias. Additionally, these studies measured when individuals eat in response to specific emotions and also used measures to assess certain emotions therefore it could be argued that the relationships were found due to both measured emotions rather than separate constructs. It has been argued that emotional eating and psychological scales measuring mood or emotion are measuring different constructs

(Arnow *et al.* 1995). The reason for this is that emotional eating scales are assessing eating in response to an emotion whereas emotional scales are measuring the intensity of the emotion.

Overall, some research indicates that emotional eating is related to weight and emotional difficulties such as depression and anxiety among young people who are obese. The limited research that has been conducted provides some support that emotional eating among those who are obese are using food to cope with negative effects. However, it appears this might be having a negative impact on their weight and ultimately their health due to the health consequences of obesity which has been previously discussed. Due to the limited research further evidence is required to explore the relationships between emotional eating, weight and emotional problems.

## **1.8 The relationships between parenting style, emotional regulation, emotional eating and lifestyle behaviours**

The following section will discuss the research that has evaluated parenting style, emotional regulation, emotional eating and lifestyle behaviours to aid our understanding on how this may impact on obesity.

### **1.8.1 Parenting style and emotional eating**

There is some evidence that shows parenting style is associated with children's emotional eating. Topman *et al.* (2011) found that authoritative parenting style was

significantly negatively associated with emotional eating among 450 female carers mainly mothers and children aged 6 to 8 years olds within the US. Further examination of the dimensions of authoritative parenting style revealed that warmth and support and use of reasoning was negatively related to children eating in response to emotions however autonomy granting was not significantly related to emotional eating. Their conclusions seem to fit with evidence that indicates that authoritative parenting style is associated with positive outcomes, as it appears that parents who are warm, supportive and provide explanations for decisions lead to children eating less to manage their emotions. This is a cross sectional study therefore it is difficult to state the direction of influence between parenting style and emotional eating.

The Topman *et al.* (2011) study did not find any significant relationships between authoritarian or permissive parenting style and emotional eating. However, using non reasoning punitive strategies, a component of authoritarian parenting style, was positively significantly related to emotional eating, suggesting that parents who punish their children without an explanation may encourage their children to eat to regulate their emotions. The limitations of this study are that it only reported mothers' reports on parenting style and not fathers'. In addition, children's emotional eating was self-reported and it could be questionable how much children as young six understood certain emotions albeit the researchers stated they simplified the wording and reduced the number of responses to each question to four.



Further research has also suggested that dimensions of parenting such as maternal support and psychological control are related to emotional eating among adolescents. For example, Snoek *et al.* (2007) found among 428 Dutch families that adolescents' (aged between 13-16 years old) reports of their mothers' and fathers' support was significantly negatively related to emotional eating. In contrast, ratings of maternal and paternal psychological control were significantly positively associated with emotional eating. These findings point towards mother and father parenting having a similar impact on adolescents' emotional eating. This provides further evidence that when parents are supportive, children eat less in response to emotions whereas when parents are highly controlling children are more likely to eat in response to emotions. However, this study was not longitudinal therefore it is difficult to conclude how much maternal and paternal support and control directly relate to emotional eating style.

There is limited research that has investigated the relationship between parenting style and emotional eating. It seems that authoritative parents who are supportive and responsive are protective against children eating in response to emotions. However, there are limitations in understanding these results together as the studies used different parenting style questionnaires and different emotional eating measures. This limits the ability to compare the results and perhaps differences in findings are due to different methods of assessment rather than true differences. Furthermore, the studies were based on cross sectional methodology, limiting the ability to compare the results.

### 1.8.2 Parenting style and lifestyle behaviours

Research proposes that parenting style is associated with children's lifestyle behaviours in respect of their food consumption and engagement in physical activity. There is a suggestion that authoritative parenting style promotes children's consumption of healthy food while authoritarian parenting style is related to children eating less healthy diets. For instance, Patrick *et al.*'s (2005) study of 231 caregivers (92 *per cent* were mothers and 2 *per cent* were fathers) of children aged 3 to 5 years old found that an authoritative feeding style was positively associated with children eating vegetables and dairy whereas, an authoritarian feeding style was negative associated with children eating vegetables. This suggests that warm supportive, responsive and demanding parents encourage children to eat healthy foods while demanding, highly controlling and non-responsive parenting leads to children eating less healthy foods. This study conducted the evaluation with African American and Hispanic caregivers and their children which limits the ability to generalise these findings to the British population. Furthermore, the study evaluated a feeding parenting style rather than a general parenting style.

Similarly, a study of 812 parents of preschool age Latino children found that reinforcement, monitoring and discipline were positively associated with healthy eating (Arredondo *et al.*, 2006). They also found that parental control was positively associated with unhealthy eating. This study did not measure parenting style specifically; however reinforcement, monitoring and discipline are characteristics of authoritative parenting style while parental control is reflective of authoritarian

parenting style. Therefore, the findings point towards authoritative parenting promoting children's diet. Again, this study was conducted with Latino American families therefore limiting the ability to generalise the findings to other populations and due to the cross sectional design it is not possible to state the direction of causation.

As well as exploring parenting style in general, researchers have begun to investigate the differing impact of maternal and paternal parenting styles on food consumption. In particular, Berge *et al.*'s (2010) five-year longitudinal study of adolescents found that a permissive paternal parenting style predicted higher weekly fruit and vegetable consumption compared to an authoritarian parenting style among girls. There was no difference found between the weekly fruit and vegetable consumption between permissive and authoritative parenting styles. The authors concluded that for girls to consume fruit and vegetables the contributing factor might be that they perceive their fathers as being warm and supportive as these are the characteristics that authoritative and permissive parenting styles share. These results indicate that an authoritative parenting style and dimensions of parenting are associated with a healthy diet. However, there are limitations in drawing conclusions from these studies due to the age range of the children and that the measures used for parenting style and diet is different.

Research indicates that sedentary behaviour and physical activity are associated with parenting. For example, a study of 2021 Dutch parents of children aged 5 years old

found that restrictive parenting towards sedentary behaviour decreased physical activity and increased sedentary behaviour (Gubbels *et al.*, 2011). It was also found that parents who encouraged their child to be active was positively associated with physical activity and negatively associated with sedentary behaviour on a daily basis. It seems that restrictive parenting which is characteristic of authoritarian parenting styles, negatively impacts on children's engagement in physical activity. One of the main limitations of this study was that all data was self-reported and that effect sizes were small which suggests that parenting can only explain a small proportion of the variance.

In addition, Arredondo *et al.* (2006) suggested that positive reinforcement and monitoring (which are aspects of an authoritative parenting style) increases children's engagement in weekly physical activity. However, they did not find parenting strategies that are associated with authoritarian parenting style (control, discipline & limit setting) to be related to physical activity and found no significant results between discipline, control and limit setting with physical activity. This is another example showing that authoritative parenting promotes healthy lifestyle choices in young people.

There is some evidence that authoritative parenting promotes healthy eating and more specifically fathers may have more of an influence on their daughter's healthy eating if he is warm and supportive towards her. Furthermore, controlling parenting appears to have the opposite effect that parents want to achieve as evidence suggests

parental control encourages children to be less active. Also, authoritative parenting components such as encouragement, reinforcement and monitoring appear to improve children's engagement in physical activity. These findings are limited as the studies have used a variety of measures to assess parenting, diet and exercise which limits the ability to compare these studies as the differences could be due to different measures used. Furthermore, these studies are limited in the variety of age range and populations used.

### **1.8.3 Parenting style and emotion regulation**

It has been previously discussed in the parenting style section 1.5 that there is some research that suggests parenting impacts on children's development, specifically their social functioning, self-esteem and psychological adjustment. The research suggests that authoritative parenting leads to children externalising and internalising their problems less which may explain less prevalence of depression. Therefore, from this evidence it is proposed that an authoritative parenting style has a positive impact on children's emotional regulation and perhaps this is the reason that these children experience fewer emotional problems.

For example, a sample of 103 college students aged 18 to 26 reported on their emotional regulation and their mothers reported on their parenting style (Manzeske & Stright, 2009). It was found that both behavioural and psychological control were negatively associated with young people's emotion regulation. Also, they found that

maternal behavioral and psychological control significantly predicted emotional regulation. This suggests that mothers who are strict, expect their rules to be obeyed, provide no reasoning for their decisions and who do not encourage autonomy lead to young people developing poorer emotion regulation.

The authors also explored the variation of the amount of behavioural and psychological control mothers used and how this impacted on young people's emotional regulation. It was found that young people's emotion regulation was significantly higher when their mothers used low behavioural and low psychological control compared to mothers who used high behavioural and high psychological control (Manzeske & Stright, 2009). Furthermore, it was noted that high behavioural and low psychological control was associated with young people's higher emotional regulation compared to mothers who used high behavioural and high psychological control. The authors interpreted the findings to suggest that maternal psychological control was related to young people's emotional regulation rather than behavioral control. This begins to provide an explanation why evidence has suggested that authoritarian parenting style which is characterised as having high psychological control is related to poorer outcomes for young people's development. However, one of the limitations of this study is that parenting style reflects the mother's perception of their own parenting style rather than the adolescent's perception.

In support of the above findings, another study of 203 adolescents aged between 11 and 18 from north-east London found that paternal psychological control and

adolescent emotional symptoms were mediated by emotional regulation (McEwen & Flouri, 2009). The study only evaluated paternal parenting style. These studies indicate that negative parental psychological control impacts on young people's emotional regulation. The limitations of these studies was that they did not evaluate both paternal and maternal parenting on emotional regulation and that they used cross-sectional methodology.

#### **1.8.4 Emotion regulation and emotional eating**

There is limited research that has investigated the relationship between emotion regulation and emotional eating. An experimental study of female students showed that when suppression is used to manage negative emotion it can result in individuals eating more than those who use reappraisal emotion regulation strategy (Evers *et al.*, 2010). There were three groups who watched the same negative emotion inducing film excerpt. One group was instructed to suppress their emotions, a second group was told to reappraise the situation (by being reminded it was not real and to take a distant perspective) while the control group were told to watch the film with no other instructions. A taste test was administered after the film to evaluate how much food they ate. It was found that the suppression group ate significantly more food in grams compared to the reappraisal group (Evers *et al.*, 2010). The authors suggested that this begins to develop the understanding of emotional eating which possibly refers to eating when negative emotions are regulated in a maladaptive way rather than just eating when negative emotions are experienced. In other words, suppression of the emotional experience resulted in them using food to manage the negative emotion

that was induced in them from the film. A limitation of this study is that it was only conducted with young adult females therefore this limits the ability to generalise to males, children and adolescents. There were also small numbers within each group.

## **1.9 Aims of current study**

In summary, research indicates that parenting style is related to BMI in young people. There is limited research investigating the impact of maternal and paternal parenting on children's weight and there is no consistent conclusion in existing research. There is a significant relationship between emotional distress and the use of food to cope with emotional problems, and that compared to their non-overweight peers obese children have a higher incidence of emotional eating. Further, previous research has relied on parental reports of parenting style and not specifically investigated any differential effects of child reported maternal and paternal parenting style. However, as far as the researcher is aware, there is no existing research examining the relationship between parenting style, emotional eating and BMI in an adolescent population in the UK.

It is clear that there is a paucity of research that attempts to understand the relative impact of psychosocial and lifestyle factors on childhood obesity. The aim of this research is to explore the relationship among potentially important factors on the weight of young people. The current study aims to further explore the relationship between parenting style and weight, emotional eating, emotional regulation and



lifestyle behaviours. In addition, to expand the research looking at the role of maternal and paternal parenting style separately, the current study will investigate the relationships with maternal and paternal parenting styles.

### **Principal Aim**

1. The aim is to examine the relationships among BMI and a) parenting style; b) emotional eating; c) emotional regulation; and d) lifestyle behaviours.

### **Secondary Aim**

2. The aim is to examine whether BMI can be predicted by healthy food habits, exercise and emotional eating among young people.

**Overview**

This study investigated the relationship between adolescents' BMI and their emotional eating, reported parenting styles, emotional regulation strategies and lifestyle behaviours.

**2.1 Design**

A cross-sectional survey design was used in this study. Adolescents were asked to complete a series of self-report measures about their mother and father's parenting style, their own emotional regulation, eating behaviour, sedentary behaviour and activity levels. In addition their height and weight were measured by the researcher.

**2.2 Ethical issues and approval****2.2.1 Ethical approval**

Ethical approval was gained from the University of Edinburgh Clinical and Health Psychology Ethics Committee (Appendix I & Appendix II) and permission was granted from the Education Authority to approach secondary schools in the area (Appendix III). Consent from the secondary schools was granted verbally by the head teacher for the researcher to conduct the research with the adolescents.

### **2.2.2 Approval from the Education Authority**

The Education Authority gave the researcher permission to contact the schools within the Authority. The initial contact involved sending out a letter by email and then a follow up telephone call (Appendix IV). Three schools gave permission for the researcher to meet with pupils in their personal development classes to introduce the study to the young people. The feedback that the researcher received from the secondary schools that declined the opportunity to participate was that they thought the timing of the research was too close to the pupils' exams. In addition, another education authority was contacted; however they stated that due to senior pupils' timetables being fully booked and the amount of research that the Education Authority was conducting they felt at this time they were unable to support this research project.

### **2.2.3 Potential distress to participants**

As a precautionary measure, in the event that an adolescent became upset while completing the questionnaire pack there was a remediation help on offer. In the first place the researcher and teacher would try to resolve the situation there and then. If the researcher felt that further input was necessary, they would advise that the adolescent contact their GP or the researcher would offer to write a referral to the local mental health services. As all participants were over the age of 16, any decision about further input had to be made with the participant. If the researcher evaluated the issue to be requiring urgent attention (for example, a risk to the

participant's own health or disclosure of current abuse) the researcher would have had to follow child protection procedures. If appropriate the researcher would make an urgent referral. In addition, the researcher's clinical supervisor, a consultant health psychologist, had agreed to be on call during the sessions that the researcher was meeting with the participants to provide the researcher with immediate supervision to discuss concerns that they may have had. None of these precautionary measures had to be implemented.

#### **2.2.4 Informed consent**

Informed consent was gained from the individual participants by the researcher at their personal development classes. They were asked to sign the consent form (Appendix VI). It was highlighted that participation was voluntary and they could withdraw at any time. Furthermore, the adolescents were provided with an opportunity to ask the researcher questions during the introduction of the study and while their height and weight were being measured by the researcher in a private room.

#### **2.2.5 Confidentiality**

Participants were informed about the confidentiality procedure in the information sheet (Appendix V) and when the researcher introduced the project to the adolescents at their personal development class. Measures were put in place to ensure confidentiality of all information. Each participant was allocated a number for

identification. Subsequently, all questionnaire data were made anonymous, transferred and stored on a password protected NHS computer. The participants' consent forms with personal information such as name were only identifiable by the researcher and this documentation was kept separate from the questionnaire pack which was used for data analysis and any written report of the research. These were kept in a locked cabinet in the researcher's room, on NHS premises. Only the researcher and the clinical supervisor had access to there data. The data and personal information will be stored in a locked cabinet within NHS premises for five years in accordance with research guidelines and thereafter will be destroyed.

### **2.3 Power and sample size**

The sample size required for the primary analysis was estimated at 90 participants to achieve acceptable power. This was based on Green's (1991) recommended calculation for multiple regression ( $N \geq 50 + (8 \times 5 \text{ variables})$ ). Green (1991) states that to achieve a power of 0.80,  $\alpha = .05$  for multiple regression,  $N \geq 50 + 8m$  (where  $m$  is the number of independent variables). The 5 independent variables were healthy food habits; exercise; 3 emotional eating subscales from the EES-C scale (three scales reflecting the urge to eat in response to: anger/frustration (EES-C-AAF), feeling unsettled (EES-C-UNS) and depression (EES-C-DEP)).

## **2.4 Participants**

Participants for this study were 112 adolescents, aged between 16 and 18 from three secondary schools in Scotland. All the participants were in their 5<sup>th</sup> or 6<sup>th</sup> year of secondary education. There were 57 male and 51 female participants; four participants did not state their gender and five did not report their age.

## **2.5 Inclusion and exclusion criteria**

The principal inclusion criteria were that the adolescents were attending a secondary school and that they were 16 years old or over. There were no additional exclusion criteria.

## **2.6 Recruitment and procedure**

The researcher was invited to introduce the study at the pupils' personal development classes in all three of the participating schools. The topic of the study was introduced by the researcher and it was explained to the pupils what participation would involve. It was emphasised that their personal information would be made anonymous. An information sheet was provided for the pupils to read and they were asked to sign a consent form before they agreed to participate in the study (Appendix VI).

The pupils were asked to complete a questionnaire pack consisting of personal information and five questionnaires (Appendices VII-XII). The researcher was

available to answer questions while the adolescents were completing the questionnaires. The adolescents' height and weight were measured in a separate room by the researcher. This was to protect confidentiality regarding their weight and height, keeping it private from their peers and teachers, and to ensure an accurate measurement. Their height was measured using a portable Leicester height measure and scales borrowed from the school nurse's room. In two of the schools, the adolescents completed the questionnaire pack and their height and weight were measured on the same day. For the third school, the adolescents completed the questionnaire pack in one day and the researcher returned to the school on two different days to measure their heights and weights. The reason for this was to fit the study into the third school's timetable.

## **2.7 Outcome measures**

The questionnaire pack consisted of five previously validated questionnaires. The reasons for their inclusion in the current study are discussed.

### **2.7.1 Demographic questionnaire**

The personal information that the adolescents were asked to provide was their age and gender (Appendix VII).

### **2.7.2 Parental Authority Questionnaire (PAQ) (*Buri, 1991*) (Appendix VIII)**

This questionnaire provides a score for permissive, authoritarian and authoritative parenting style and has been designed for teenagers to self-report on their experience of being parented. There were two forms consisting of 30 items each, to report mothers' and fathers' parenting style separately (Appendix VIII).

Each participant has six separate subscale scores consisting of 10 items each: mother's permissiveness (e.g. 'While I was growing up my mother felt that in a well-run home the children should have their way in the family as often as the parents do'), mother's authoritarianism (e.g. 'Even if her children didn't agree with her, my mother felt that it was for our own good if we were forced to conform to what she thought was right'), mother's authoritativeness (e.g. 'As I was growing up, once family policy had been established, my mother discussed the reasoning behind the policy with the children in the family'), father's permissiveness (e.g. 'As I was growing up my father did not feel that I needed to obey rules and regulations of behaviour simply because someone in authority had established them'), father's authoritarianism (e.g. 'As I was growing up my father let me know what behaviour he expected of me and if I didn't meet those expectations, he punished me') and father's authoritativeness (e.g. 'As the children in my family were growing up, my father consistently gave us direction and guidance in rational and objective ways'). Scores on each of these scales can vary from 10 to 50, the higher the score the greater the level of that parenting style. Each item is rated using a five-point Likert type scale, where one represents 'strongly disagree' and five 'strongly agree'.



## **Psychometric properties of the PAQ**

This measure was validated in a high school and a college population (mean age of 17.4 and 18.8 years respectively). The test retest reliability of the questionnaire over a two week period was between .77 to .92 (Buri, 1991), indicating good test retest reliability. The Cronbach's coefficient alpha values were between .74 and .87 for the six scales (Buri, 1991) which was an acceptable internal consistency.

### **2.7.3 The Regulation of Emotions Questionnaire (REQ) (Phillips & Power, 2007) (Appendix IX)**

The REQ is designed to measure the frequency that young people use internal or external methods to regulate their emotions. It was specifically designed to measure emotional regulation in a UK population who were between the ages of 12 and 19. The questionnaire derives four subscales indicating if the methods of coping are functional or dysfunctional (i.e. internal functional, internal dysfunctional, external functional and external dysfunctional). The participants rated each item on a five-point Likert type scale where a score of 1 represents the answer of 'not at all' and a score of 5 represents the answer of 'always'. Scores are derived for each of the four emotional regulation subscales by summing the relevant items: internal dysfunctional (5 items scored together; e.g. 'I dwell on my thoughts and feelings'), internal functional (5 items scored together; e.g. 'I review (re-think) my goals or plans'), external dysfunctional (5 items scored together; e.g. 'I bully other people') and external functional (4 items scored together; e.g. 'I talk to someone about how I feel').

## **Psychometric properties of the REQ**

The four scales have previously been reported to show Cronbach's alpha values of .76, .72, .66 and .76 for internal functional, internal dysfunctional, external functional and external dysfunctional respectively (Phillips & Power, 2007). This measure was validated against a psychosomatic health problems questionnaire, where significant positive correlations between REQ internal and external dysfunctional emotional regulation strategies and psychosomatic health problems were reported (Phillips & Power, 2007); this indicated that the REQ is measuring unhelpful internal and external coping methods to regulate emotions in the age range of 12 to 19 years. This measure was chosen for the present study as it was designed for use and validated with a similar age group.

### **2.7.4 Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C) (Tanofsky-Kraff *et al.*, 2007) (Appendix X)**

The EES-C is designed to measure eating behaviour in response to negative affect. The scale consists of 26 items and forms three scales reflecting the urge to eat in response to: anger/frustration (EES-C-AAF), feeling unsettled (EES-C-UNS) and depression (EES-C-DEP). This measure has been validated in a United States sample of children between 8 and 18 years old. Participants rate their response to eat for each emotion item on a five-point scale ('no desire', 'small desire', 'moderate desire', 'strong urge' and 'an overwhelming urge to eat'). Subscale scores are obtained from the mean of all relevant items: EES-C-AA (the mean is calculated from 14 items); EES-C-DEP (the mean is calculated from 10 items) and the EES-C-

UNS (the mean is calculated from 4 items). Some items are used in more than one subscale. Higher scores for each subscale indicate a greater desire to eat in response to a mood state.

### **Psychometric properties of the EES-C**

The subscales have previously demonstrated good internal consistency, with Cronbach's alpha values reported as .95, .92 and .83 for the anger/frustration scale, the depression scale and the feeling unsettled scale respectively (Tanofsky-Kraff *et al.*, 2007). Furthermore the measure displayed good convergent validity as participants who showed loss of control of eating on Questionnaire of Eating and Weight Patterns-Adolescent Version (Johnson *et al.*, 2001) had significantly higher EES- C scores (Tanofsky-Kraff *et al.*, 2007). The test retest reliability of average of 3.35 months was adequate, with the subscale correlation  $r$  values of .59 (EES-C AAF), .74 (EES-C DEP) and .66 (EES-C UNS) (Tanofsky-Kraff *et al.*, 2007).

#### **2.7.5 Adolescent Food Habits Checklist (AFHC) (Johnson *et al.*, 2002) (Appendix XI)**

To measure diet, the adolescents in the current sample were asked to complete the Adolescent Food Habits Checklist. This measure was validated in a UK sample of adolescents between the age of 13 and 16. It is designed to measure adolescents' healthy eating behaviour, intake of high energy foods and vegetables and snacking behaviour. An overall score is derived for healthy eating habits. Respondents are

asked to rate the 23 items as 'true', 'false' or 'not applicable to me'. The final score for the AFHC was adjusted to take account of the missing items or 'not applicable to me' responses using the formula described in Johnson *et al.* (2002): AFHC score = number of healthy responses x (23/number of items completed).

### **Psychometric properties of the AFHC**

The scale shows a good internal reliability (Cronbach's alpha of .82) and test re-test reliability with two weeks delay ( $r = .90$ ; Johnson *et al.*, 2002).

#### **2.7.6 Sedentary behaviour and exercise (Appendix XII)**

The participants were asked to report how many hours they spend watching television, using a computer and playing video games on an average school day and weekend day. In addition, they were asked to state how many hours they spend in an average week on physical activity at school, a sports club and during their free time. These questions were adapted from Andersen *et al.* (1998). A sedentary behaviour total score was calculated by adding the number of hours each participant spent watching TV, using a computer and playing video games on a school day and weekend day. An exercise total score was calculated by adding the number of hours of physical activity each adolescent spent at school, sports clubs and free time put together.

### 2.7.7 Body Mass Index (BMI)

Each participant's weight was measured in kilograms (kg) and their height in (m). To calculate BMI, weight was divided by height in metres squared ( $\text{BMI}=\text{kg}/\text{m}^2$ ).

There is a debate in the literature regarding how useful BMI is as a measure. A review by Freedman & Sherry (2009) indicated that BMI is a moderately sensitive measure of obesity in children. However, Scottish Intercollegiate Guidelines Network (SIGN) Number 115: Management of obesity (2010) concluded that BMI UK percentiles should be used to diagnose being overweight and obesity in children. The SIGN (2010) considered IOTF BMI-cut offs, but concluded that the studies using IOTF were limited due to small sample sizes. Cole *et al.* (2000) based BMI weight ranges on a sample of 97,876 males and 94,851 females within the age range of 6 to 18 years. These cut-offs are corrected for age and gender, are recognised internationally and are linked to adult cut-offs therefore aiding interpretation of risk factors in adulthood (Cole *et al.*, 2000). As the research is limited in investigating the relationships between parenting style, emotional regulation, emotional eating and lifestyle behaviours and previous research has been international rather than UK-based, it was decided to use the BMI cut-offs to define underweight, normal weight, overweight and obese (Cole *et al.*, 2000; Cole *et al.*, 2007). This would allow comparison of the study's findings to other international research. BMI of 17 to <18.5 is classed as a grade one thinness, normal weight is classed as BMI between 18.5 and 25 cut-offs (Cole *et al.*, 2007), overweight is BMI of between 25 and 30 cut-offs and obesity is a BMI equal to or greater than 30 cut offs (Cole *et al.*, 2000).

These are linked to the adult cut-offs of body mass index for overweight and obesity; BMI of 25 and 30 (Cole *et al.*, 2000). The cut-offs are adjusted for age and the tables from Cole *et al.* (2007) were used to assess thinness while the tables from Cole *et al.* (2000) were used to assess overweight and obesity within the sample. One male and four females did not report their ages which meant their weight categories could not be determined.

## **2.8 Statistical Analysis**

The analysis was conducted using a statistical software package designed for social sciences SPSS for Windows (Version 17.0).

### **2.8.1 Principal analysis**

To examine the relationships among BMI and a) parenting style; b) emotional eating; c) emotional regulation, and d) lifestyle behaviours. Pearson's product-moment correlations were conducted to explore the relationships between the variables to examine the principal analysis (Field, 2005).

### **2.8.2 Secondary analysis**

To evaluate if healthy food habits, exercise and emotional can predict young peoples' BMI. Hierarchical regression analyses were computed to examine whether BMI

could be predicted by an adolescents' healthy food habits, exercise and emotional eating.

**3.1 Exploring the data****3.1.1 Missing Data**

There were 95 participants who did complete scores for maternal parenting style, 96 had completed scores for paternal parenting style, 106 participants had complete scores for emotional regulation and weekly sedentary behaviour, 105 young people completed the emotional eating scale, 100 participants reported their weekly exercise and 112 reported their healthy eating behaviour and BMI was measured for 112 adolescents. The individual mean for the subscales was calculated and inputted to the missing values (Field, 2005; Tabachnick & Fidell, 2001).

**3.1.2 Exploration of normality and transformed data**

To explore the normality of scores on individual scales, the Skewness and Kurtosis indices were used. To test if scores for each variable were significantly skewed, the Skewness and Kurtosis statistics were divided by their standard errors. If the calculated ratio was between -2 and +2 then significant skew was not indicated (Field, 2005). When the scores were out with these limits then a transformation was applied (Clark-Carter, 2004). This was the case for BMI (reciprocal transformation), weekly exercise (Log10 transformation), weekly sedentary behaviour (Log10 transformation), internal dysfunctional emotional regulation (Log10 transformation), external dysfunctional (reciprocal transformation) and father permissive parenting



style (Log10 (K-X) transformation). The calculated ratios before transformations were for Skewness between 7.1 and -2.21 while the Kurtosis ratios were between 7.3 and .87. Once these six outcome variables were transformed, Skewness z scores were between 1.96 and -.42. The raw data were used for these six outcome variables for the descriptive statistics and the transformed data were used when doing the principle and secondary analysis.

## 3.2 Descriptive statistics

### 3.2.1 Participants

There were 112 participants in the study; 57 (51 *per cent*) were male and 51 (46 *per cent*) were female. Four (4 *per cent*) participants did not report their gender and five (4 *per cent*) participants did not report their age. Therefore, all analyses that include the sex and age of participants are based on a sample size of 108 or 107 and total number of participants for BMI is 112 as it does not require age or gender to be calculated. The mean for age was 16.4 years old. Table 3.1 shows the mean and standard deviation for age and BMI.

**Table 3.1** The mean and standard deviation for age and BMI of participants

Variable	N			Mean (SD)		
	Male	Female	All participants valid scores	Male	Female	All participants valid scores
Age	56	51	107	16.4 (0.6)	16.3 (0.6)	16.4 (0.6)
BMI	56	51	112	23.3 (4.1)	23.5 (4.3)	23.4 (4.3)

### 3.2.2 BMI

Table 3.2 shows the number and percentages within each of the BMI classifications of normal weight, overweight and obese for the total sample, males and females. As illustrated, the vast majority of participants' BMI (about seven in ten) fell within the normal range, and the remaining were either overweight or obese. An independent *t*-test showed that there was no significant difference between males ( $M=0.04$ ,  $SD=0.007$ ) and females ( $M=0.04$ ,  $SD=0.007$ );  $t(106)=-.106$ ,  $p=0.873$ .

**Table 3.2** BMI and weight categories for the total sample, males and females

	Normal weight (BMI 18.5 - <25 cut off)	Overweight (BMI 25 - <30 cut off)	Obese (BMI >30)	Total
Male N (%)	37 (66.1%)	16 (28.5%)	3 (5.4%)	56
Female N (%)	37 (72.5%)	9 (17.6%)	5 (9.8%)	51
All participants N (%)	74 (69.2%)	25 (23.4%)	8 (7.5%)	107

### 3.2.3 Parenting style

Table 3.3 displays the mean and standard deviation for participant-rated parenting style. An independent *t*-test found that females reported their fathers as significantly less ( $M=27.6$ ,  $SD=6.2$ ) authoritarian than males ( $M=30.1$ ,  $SD=6.9$ );  $t(96)=2.5$ ,  $p=0.015$ . There were no other significant differences. The missing data for the six parenting styles was mother permissive (3), mother authoritarian (3), mother

authoritative (1), father permissive (12), father authoritarian (10) and father authoritative (11).

**Table 3.3** The mean and standard deviation for parenting style

Variable	N			Mean (SD)		
	Male	Female	All participants valid scores	Male	Female	All participants valid scores
<b>Mother permissive</b>	57	48	109	28.2 (4.3)	28.8 (4.9)	28.3 (4.8)
<b>Mother authoritarian</b>	57	48	109	28.8 (5.1)	29 (6.6)	29.1 (5.9)
<b>Mother authoritative</b>	56	51	111	33.5 (4.9)	34.3 (6.6)	33.3 (5.8)
<b>Father permissive</b>	52	44	99	28 (5.3)	29 (4.5)	28.6 (4.9)
<b>Father authoritarian</b>	53	45	102	30.1 (6.9)	27.6 (6.2)	29.4 (6.7)
<b>Father authoritative</b>	52	45	101	32.6 (5.2)	34.4 (7.0)	33.5 (6.2)

### 3.2.4 Emotional regulation strategies

The mean and standard deviation for male, female and all participants are provided in Table 3.4. An independent *t*-test found that males ( $M=0.11$ ,  $SD=0.03$ ) reported significantly higher use of internal dysfunctional emotional strategies than females ( $M=0.09$ ,  $SD=0.03$ );  $t(104)=3.6$ ,  $p=0.001$ . No other significant differences were found. The missing data for the 4 emotional regulation strategies are external dysfunctional emotional strategies (1), internal dysfunctional emotional strategies

(2), external functional motion strategies (1) and internal functional emotional strategies (4).

**Table 3.4** The mean and standard deviation for emotional regulation strategies

Variable	N			Mean (SD)		
	Male	Female	All participants	Male	Female	All participants
<b>IDF</b>	56	50	110	2.0 (0.07)	2.6 (0.9)	2.3 (0.8)
<b>EXDF</b>	56	50	111	1.9 (0.7)	1.8 (0.8)	1.9 (0.7)
<b>EXF</b>	56	51	111	3.2 (0.8)	3.1 (0.1)	3.1 (0.8)
<b>IF</b>	55	50	109	3.2 (0.9)	3.0 (0.1)	3.1 (0.8)

**IDF = internal dysfunctional emotional strategies**

**EXDF = external dysfunctional emotional strategies**

**IF = internal functional emotional strategies**

**EXF = external functional motion strategies**

### 3.2.5 Emotional eating

The mean and standard deviations for male, female and all participants are provided in Table 3.5. An independent *t*-test found that males reported significantly higher ( $M=2.0$ ,  $SD=0.8$ ) eating in response to feeling unsettled than did females ( $M=1.7$ ,  $SD=0.6$ );  $t(101)=2.2$ ,  $p=0.024$ ). There were no other significant differences found. The missing data for the three emotional eating strategies was eating in response to feeling unsettled scale (6), eating in response to feeling depressed scale (6) and eating in response to anxiety, anger and frustration scale (5).

**Table 3.5** The mean and standard deviation of the participants' emotional eating

Variable	N			Mean (SD)		
	Male	Female	All participants	Male	Female	All participants
<b>UNS</b>	53	50	106	2.0 (0.8)	1.7 (0.6)	1.8 (0.7)
<b>DEP</b>	52	50	106	2.4 (0.8)	2.3 (0.8)	2.4 (0.8)
<b>AAF</b>	53	50	107	2.0 (0.8)	1.8 (0.7)	1.9 (0.7)

**UNS = eating in response to feeling unsettled scale**

**DEP = eating in response to feeling depressed scale**

**AAF = eating in response to anxiety, anger and frustration scale**

### 3.2.6 Lifestyle behaviours

The mean and standard deviation for male, female and all participants lifestyle behaviours are provided in Table 3.6. An independent *t*-test identified that females ( $M=12.7$ ,  $SD=4.8$ ) reported significantly healthier food habits than males ( $M=10.2$ ,  $SD=5.3$ );  $t(106)=2.5$ ,  $p=0.014$ . The missing data for the three lifestyle behaviours were weekly exercise (17), weekly sedentary behaviour (20) and none for healthy food habits.

**Table 3.6** The mean and standard deviation for the participants' lifestyle behaviours

Variable	N			Mean (SD)		
	Male	Female	All participants	Male	Female	All participants
<b>Healthy Food habits</b>	57	51	112	10.2 (5.3)	12.7 (4.8)	11.4 (5.2)
<b>Weekly sedentary behaviour</b>	39	39	92	38.9 (15.1)	38.4 (18.7)	38.5 (16.8)
<b>Weekly Exercise</b>	39	39	95	6.9 (6.1)	4.7 (4.0)	5.9 (5.4)

### 3.3 Principal analysis

Pearson's product-moment correlations were conducted to explore the relationships among BMI and a) parenting style; b) emotional eating; c) emotional regulation, and d) lifestyle behaviours.

As illustrated by Table 3.7, there were no significant relationships between participants' BMI and a) parenting style; b) emotional eating, c) emotional regulation and d) lifestyle behaviours.

**Table 3.7** The relationships between BMI, parenting style, emotional eating, emotional regulation and lifestyle behaviours

	BMI	MA	MN	MP	FA	FN	FP	UN	DE	AF	IF	EF	ID	ED	EX	SB	HF
BMI		.01	-.08	.07	.12	-.13	-.01	.14	.07	.08	-.02	.10	.16	.09	-.17	-.04	-.018
MA			-.01	.03	.15	.15	.04	.87	.17	.14	<b>.22*</b>	<b>.31**</b>	-.09	.07	.02	<b>-.27**</b>	.07
MN				<b>-.34**</b>	.15	<b>.27**</b>	.07	-.05	-.04	-.03	-.04	<b>-.19*</b>	<b>-.20*</b>	.02	<b>.22*</b>	.07	-.11
MP					-.18	-.17	<b>-.53**</b>	-.02	.05	.02	-.07	.11	-.10	-.17	-.17	.12	-.10
FA						.01	-.07	-.07	.01	-.01	.07	.19	-.10	<b>.21*</b>	.14	<b>-.27*</b>	.15
FN							<b>.41**</b>	-.01	.08	.09	-.03	-.04	.01	-.14	-.04	-.05	-.16
FP								-.01	.01	.03	-.01	.08	.17	.01	-.01	-.19	.02
UN									<b>.64**</b>	<b>.76**</b>	<b>.25*</b>	.14	-.05	<b>-.24*</b>	.05	.10	-.15
DE										<b>.82**</b>	<b>.25**</b>	.12	<b>-.24*</b>	<b>-.20*</b>	.05	-.03	-.13
AF											<b>.27**</b>	<b>.19*</b>	-.17	<b>-.25*</b>	.12	-.03	-.15
IF												<b>.45**</b>	<b>-.20*</b>	.17	.05	-.05	<b>.22*</b>
EF													.03	.14	-.02	-.15	.05
IDF														.17	.01	-.11	-.07
EDF															-.04	-.13	<b>.27**</b>
EX																.06	.09
SB																	<b>-.28**</b>
HF																	

\*  $p < 0.05$  \*\*  $p < 0.01$

BMI = body mass index, MA = mother authoritative parenting style, MN = mother authoritarian parenting style, MP = mother permissive parenting style, FA = Father authoritative parenting style, FN = mother authoritarian parenting style, FP = Father permissive parenting style, UN = eating in response to feeling unsettled scale, DE = eating in response to feeling depressed scale, AF = eating in response to anxiety, anger and frustration scale, IF = internal functional emotional regulation strategies, EF = external functional emotional regulation strategies, ID = internal dysfunctional emotional regulation strategies, ED = external dysfunctional emotional regulation strategies, EX = weekly exercise, SB = weekly sedentary behaviour and HF = healthy food habit.

### 3.4 Secondary analysis

The aim of the secondary analysis was to explore whether BMI could be predicted from healthy food habits, exercise and emotional eating. A hierarchical regression analyses were conducted following the procedures by Field (2005) to investigate if BMI could be predicted from healthy food habits, exercise and emotional eating. The multiple regression results are presented in Table 3.8.

At step 1 healthy food habits were entered, exercise was entered in at step 2, eating in response to feeling unsettled was entered in at step 3, eating in response to feeling depressed was entered in at step 4 and eating in response to feeling anxious, frustrated and angry was entered in at step 5. The reason that this order was chosen was that healthy eating and exercise relate to the energy imbalance that has been suggested to be related to BMI. This appeared to be the variables that would be directly related to BMI more so than emotional eating. The correlation between BMI and healthy food habits was  $r = -.18$  while BMI and exercise was  $r = -.17$  (table 3.8). It seems that these have a similar impact on BMI. It was decided to input eating in response to feeling unsettled at step 3 as the correlation between BMI and this variable was  $r = .14$ . While the relationship between BMI and eating in response to feeling depressed was  $r = .07$  and eating in response to feeling anxious, frustrated and angry was  $r = .08$  which appeared to have similar impact on BMI therefore these were inputted at step 4 and step 5.



The  $R^2$  provides an indication of the percentage of variance in BMI predicted by the model.  $\Delta R^2$  at each step of the regression analysis indicates how much increase there was in variance in BMI accounted for by each predictor. The F value indicates, along with its significance, if the model is a good fit.

**Table 3.8** Hierarchical regression analysis predicting BMI from healthy food habits, exercise and emotional eating (N=95).

Variables entered	B(un-standardised)	SE B	$\beta$ (standardised)	<i>p</i>	R <sup>2</sup>	$\Delta$ R <sup>2</sup>	F	<i>p</i>
<b>Step 1</b>					.032		3.09	.08
Constant	.05	.002						
HF	.000	.000	-.18	.082				
<b>Step 2</b>					.053	.021	2.60	.08
Constant	.05	.002						
HF	.00	.000	-.16	.121				
EX	-.001	.001	-.15	.154				
<b>Step 3</b>					.072	.019	2.37	.076
Constant	.052	.003						
HF	.000	.000	-.14	.167				
EX	-.002	.001	-.15	.139				
UN	-.017	0.12	-.14	.176				
<b>Step 4</b>					.073	.001	1.76	.44
Constant	.053	.005						
HF	.000	.000	-.14	.169				
EX	-.002	.001	-.15	.141				
UN	-.018	.016	-.15	.270				
DE	.000	.000	-.01	.929				
<b>Step 5</b>					.079	.006	1.52	.191
Constant	.055	.006						
HF	.000	.000	-.15	.152				
EX	-.002	.001	-.15	.140				
UN	-.026	.019	-.21	.179				
DE	.000	.000	.08	.654				
AF	.000	.000	-.16	.438				

**Constant**= BMI, **HF** = healthy food habits, **EX** = weekly exercise **UN** = eating in response to feeling unsettled scale, **DE** = eating in response to feeling depressed scale, **AF** = eating in response to anxiety, anger and frustration scale and **SE B**= Standard error of B

**Step one (healthy food habits)** The step one model had an  $R^2$  value of 0.032 which means that 3.2 *per cent* of the variance in BMI is accounted for by adolescent healthy food habits and it was not significant ( $F(1, 93) = 3.09, p = .082$ ) Healthy food habits score did not make a significant contribution to BMI, however it was approaching significance ( $\beta$  (un-standardised) = .000,  $t(93) = 1.76, p = .082$ ).

**Step two (exercise)** At step two the  $R^2$  was .053 and change in  $R^2$  was .021. This means that 5.3 *per cent* of the variance in BMI is accounted by adolescent healthy food habits and exercise while the addition of exercise accounted for 2.1 *per cent* additional variance however these did not make a significant contribution to BMI ( $F(2, 92) = 2.60, p = .080$ ). The change in the  $R^2$  was not significantly different from step 1 ( $\Delta R^2 = .021, p = .154$ ). The model of including healthy food habits and exercise was not a good fit for predicting BMI. Healthy food habits ( $\beta$  (un-standardised) = .000,  $t(92) = 1.57, p = .121$ ) and exercise ( $\beta$  (un-standardised) = -.001,  $t(92) = 1.43, p = .154$ ).

**Step three (eating in response to feeling unsettled)** With the addition of eating in response to feeling unsettled, the  $R^2$  was .072 and  $\Delta R^2$  was .019, indicating that 7.2 *per cent* of the variance in BMI was accounted by adolescent healthy food habits, exercise and eating in response to feeling unsettled while eating in response to feeling unsettled accounted for 1.9 *per cent* of the variance and again was not significant ( $F(3, 91) = 2.37, p = .076$ ). The change in the  $R^2$  was not significantly different from step 2 ( $\Delta R^2 = 0.019, p = .176$ ). The model of including healthy food

habits, exercise and eating in response to feeling unsettled was not a good fit for predicting BMI. Healthy food habits ( $\beta$  (un-standardised) = .000,  $t$  (91) = 1.39,  $p$  = .167), exercise ( $\beta$  (un-standardised) = -.002,  $t$  (91) = 1.49,  $p$  = .139), eating in response to feeling unsettled ( $\beta$  (un-standardised) = -.002,  $t$  (91) = 1.371,  $p$  = .179).

***Step four (eating in response to feeling depressed)*** The  $R^2$  was .073 and  $\Delta R^2$  was .001. Therefore, 7.3 *per cent* of the variance in BMI was accounted by adolescent healthy food habits, exercise, eating in response to feeling unsettled and eating in response to feeling depressed while eating in response to feeling depressed accounted for less than 1 *per cent*, however this model was not significant ( $F$  (4, 90) = 1.76,  $p$  = .144). The change in the  $R^2$  was not significantly different from step 3 ( $\Delta R^2$  = .001,  $p$  = .929). The model including eating in response to feeling depressed, healthy food habits, exercise and eating in response to feeling unsettled was not a good fit for predicting BMI. Healthy food habits ( $\beta$  (un-standardised) = .000,  $t$  (90) = 1.39,  $p$  = .169), exercise ( $\beta$  (un-standardised) = -.002,  $t$  (90) = 1.49,  $p$  = .141), eating in response to feeling unsettled ( $\beta$  (un-standardised) = -.002,  $t$  (90) = 1.11,  $p$  = .270) and eating in response to feeling depressed ( $\beta$  (un-standardised) = .000,  $t$  (90) = .089,  $p$  = .929). Again this shows adding eating in response to feeling depressed did not significantly improve the fit of the model to predict BMI.

***Step five (Eating in response to feeling angry, anxious and frustrated)*** The results in Table 3.8 suggest that overall this is not a good model for predicting BMI ( $F$  (5, 89) = 1.52,  $p$  = .191). The  $R^2$  was .079 and  $\Delta R^2$  was .006. Overall, 7.9 *per cent* of the

variance in BMI was accounted by adolescent healthy food habits, exercise, eating in response to feeling unsettled, depressed and feeling angry, anxious and frustrated while eating in response to feeling angry, anxious and frustrated accounted for less than 1 *per cent*. The change in the  $R^2$  was not significantly different from step 4 ( $\Delta R^2 = 0.006$ ,  $p = .438$ ). The model of including eating in response to feeling angry, anxious and frustrated, eating in response to feeling depressed, healthy food habits, exercise and eating in response to feeling unsettled was not a good fit for predicting BMI. Healthy food habits ( $\beta$  (un-standardised) = .000,  $t$  (89) = 1.45,  $p = .152$ ), exercise ( $\beta$  (un-standardised) = -.002,  $t$  (89) = 1.49,  $p = .140$ ), eating in response to feeling unsettled ( $\beta$  (un-standardised) = .002,  $t$  (89) = -1.35,  $p = .179$ ), eating in response to feeling depressed ( $\beta$  (un-standardised) = .001,  $t$  (89) = .449,  $p = .654$ ) and eating in response to feeling anxious, angry and frustrated ( $\beta$  (un-standardised) = .002,  $t$  (89) = .780,  $p = .438$ ).

Overall, the hierarchical regression showed that healthy food habits, exercise and emotional eating did not predict BMI. Therefore, these results suggest that this is not a good model to predict BMI.

### **3.5 Further analysis**

Pearson's product-moment correlations were conducted to explore the relationships among a) parenting style; b) emotional eating; c) emotional regulation, and d) lifestyle behaviours (Table 3.7).

#### **3.5.1 Parenting style and emotional regulation strategies**

There was a significant positive relationship between mother authoritative parenting style and a) external functional emotional regulation strategies ( $r = .31, p = 0.001$ ), and b) internal functional emotional regulation strategies ( $r = .22, p = 0.025$ ). In addition, there was a significant negative relationship between mother authoritarian parenting style and (a) internal dysfunctional emotional regulation strategies ( $r = -.20, p = 0.037$ ) and (b) external functional emotional regulation strategies ( $r = -.19, p = 0.047$ ). Furthermore, there was a significant positive relationship between father authoritative parenting style and external dysfunctional emotional regulation strategies ( $r = .21, p = 0.038$ ).

#### **3.5.2 Parenting style and emotional eating**

There were no significant relationships found between parenting style and emotional eating (see Table 3.7).

### 3.5.3 Emotional regulation strategies and emotional eating

There were a number of significant relationships between self-reports of emotional regulation strategies and emotional eating (Table 3.7). Internal dysfunctional emotional regulation was significantly (negatively) related to eating when depressed ( $r = -.24, p = 0.013$ ). Furthermore, external dysfunctional emotional regulation was significantly (negatively) related to all three measures of emotional eating: a) eating in response to feeling unsettled ( $r = -.24, p = 0.012$ ); b) eating a response to feeling depressed ( $r = .20, p = 0.039$ ), and c) eating in response to feeling anxious, angry and frustration ( $r = .25, p = 0.010$ ). These results indicate that participants who used external dysfunctional emotional regulation strategies were less likely to eat when feeling anxious, angry and frustration or unsettled. In addition, participants who used external dysfunctional emotional regulation strategies and internal dysfunctional emotional regulation were less likely to eat when feeling depressed.

There were also significant relationships between aspects of functional emotional self-regulation and emotional eating. Internal functional self-regulation was positively associated with all three measures of emotional eating: a) for eating in response to feeling unsettled ( $r = .25, p = 0.011$ ); b) eating in response to feeling depressed ( $r = .25, p = 0.010$ ), and c) for eating in response to feeling anxious, anger and frustration ( $r = 0.27, p = 0.005$ ). Moreover, external functional emotional regulation was significantly (and positively) associated with eating in response to feeling anxious, angry and frustrated ( $r = .19, p = 0.048$ ). Participants who used internal functional emotional regulation strategies were significantly more likely to

eat when feeling depressed or when feeling unsettled. Furthermore, participants who used internal and external functional emotional regulation strategies were significantly more likely to eat in response to feelings of anxiety, anger and frustration.

#### **3.5.4 Lifestyle behaviours and parenting style**

There was a significant negative relationship between weekly sedentary behaviour and (a) mother authoritative parenting style ( $r = -.27, p = 0.010$ ) and (b) father authoritative parenting style ( $r = -.27, p = 0.015$ ). In addition, there was a significant positive relationship between mother authoritarian parenting style and weekly exercise ( $r = .22, p = 0.032$ ). There were no other significant relationships between parenting style and lifestyle behaviours.

#### **3.5.5 Lifestyle behaviours and emotional regulation**

Furthermore, there were only two positive significant relationships between healthy food habits and emotional regulation. These were (a) internal functional emotional regulation ( $r = .22, p = 0.024$ ) and (b) external dysfunctional emotional regulation ( $r = .27, p = 0.005$ ).

There were no significant relationships found between lifestyle behaviours and emotional eating.



### **3.5.6 Relationships between lifestyle behaviours**

To explore the relationships between lifestyle behaviours Pearson's product-moment correlations were performed. These correlations are displayed in Table 3.8.

There was a significant negative relationship between sedentary behaviour and healthy food habits ( $r = -.28$ ,  $p = 0.007$ ). There were no other significant relationships found between each component of lifestyle behaviour.

## Overview

### 4.1 Interpretation of findings

The aim of this study was to evaluate the relationships between BMI, parenting style, emotional regulation, emotional eating and lifestyle behaviours and to explore whether these were potentially important determinants that influence young people's weight. The findings of this study will be discussed in relation to previous literature.

#### 4.1.1 Principal exploration: To investigate the relationships among BMI and parenting style, emotional eating, emotional regulation and lifestyle factors

This study found no significant relationships among BMI and maternal or paternal parenting styles, emotional eating, emotional regulation and lifestyle factors. The research evidence on the relationship between parenting styles and weight is, overall, equivocal. Some research has found a relationship between these variables (Hughes *et al.*, 2008; Berge *et al.*, 2010; Olvera & Power, 2010; Rhee *et al.*, 2006; Wake *et al.*, 2007) whereas other research has not (Blisset & Haycraft, 2008; Brann & Skinner *et al.* 2005; Taylor *et al.*, 2011). Therefore, the current findings are consistent with some previous studies and inconsistent with others.

The research that has investigated the relationship between parenting style and weight has mainly been conducted with children under 5 years old whose parents completed self-report inventories (Hughes *et al.*, 2008; Rhee *et al.*, 2006; Wake *et al.*, 2007). This may indicate that the age of the children impacts on the nature and strength of the relationship between parenting style and BMI. It might be that, as young people develop their reliance and dependence on their parents decreases. Therefore some of the differences between the results reported in this study and those in the previous literature may be reflective of the fact that participants in the current study are considerably older. However, Berge *et al.*'s (2010) findings indicated that parenting style was related to adolescents' weight. As this study was conducted among adolescents from the US and other studies were from the US or Australia, it might be that cultural differences also contribute to the discrepancy in findings.

Furthermore, there is variation between studies in how parenting has been measured. Several studies have evaluated parenting using measures that assess a parent's responsiveness, demandingness or nurturance and control towards their child, where parenting style is derived from whether parents scored high or low on these dimensions (Berge *et al.*, 2010; Wake *et al.*, 2007). Others have used a specific parenting style questionnaire related to feeding, such as the Caregiver's Feeding Style Questionnaire (Hughes *et al.*, 2008). These measures are all somewhat different in the ways they conceptualise parenting. There does not appear to be a gold standard or even an agreed method to assess parenting style within the literature and this

limits the ability to compare findings. Perhaps the inconsistent findings within the literature including, the current study, are in part due to the variety of measures used.

On the other hand the inconsistent findings could potentially be explained by other variables that were not measured in this study, such as the impact of peer relationships on adolescent's weight. There is some evidence to suggest that peers' influence is significantly positively related to adolescents' disordered eating (Meyer & Gast, 2008) and calorie intake (Salvy *et al.*, 2007). An examination of both parental and peer influence on adolescents' weight may have provided further understanding on the contributing factors of their weight. However, this was not conducted due to it being outwith the remit of this thesis.

It does seem that those researchers who focused on measuring parenting style specifically associated with young people's eating behaviour (such as restriction to food and pressure to eat), rather than in relation to general behaviour, more commonly found significant relationships between parenting and weight (Faith *et al.*, 2004; Farrow & Blisset, 2011; Joyce & Zimmer-Gembeck, 2009). In contrast, research that has focused on general parenting has produced mixed findings (Berge *et al.*, 2010; Blisset & Haycraft, 2008). It may well be the case that parents are not entirely consistent in their parenting approaches across all situations. Therefore, one would expect a weaker relationship between weight and general parenting style, than may be the case for weight and a measure of specifically eating/diet-related parenting. If this is the case, then the current study may have been more successful in

revealing a significant relationship between parenting and BMI if measurements were targeted more specifically at parental strategies or styles in relation to eating rather than parenting behaviour *per se*. Therefore, perhaps the Child Feeding Questionnaire (Birch *et al.*, 2001) or the Caregiver's Feeding Styles Questionnaire (Hughes *et al.*, 2005) would have been more suitable to assess parenting related to eating. It has been suggested that when general parenting style and young people's weight is assessed the research is inconsistent due to parenting not having a direct influence on weight (Ventura & Birch, 2008). Therefore in order to understand the relationship further, it may be that other possible mediating variables need to be measured.

Overall the research investigating whether parenting style is related to children's weight appears to be inconsistent and the current study found no significant association. It is possible that the sample size was too small to detect effects and further studies need to ensure that they recruit enough participants to achieve sufficient power to detect effects. However, if relationships between parenting style and young people's weight are small, then it may be the case that any relationship between parenting styles and young people's weight, in the general population at least, is of scientific rather than clinical relevance. It is difficult to see how interventions targeted at the general population (of young people and families) could or should address parenting issues in ways that would make a clinically relevant difference, on the basis of the present findings.

Currently the recommended treatment for young people who are obese is a lifestyle intervention which encourage changes in diet and physical activity through the use of behavioural change strategies based on psychological theories, along with family involvement (SIGN, 2010; NICE, 2006). It is unknown at the moment how family involvement is contributing to the success of these lifestyle interventions and whether these interventions are addressing parenting. It would be helpful for research in the future to evaluate how parents are contributing to the success of lifestyle interventions and whether focusing on parenting directly would prevent the young people's continued weight gain. There needs to be further evidence to verify the influence of parenting on children's weight and the size of the effect to justify clinicians providing interventions that specifically target parenting to prevent the increase in children's weight and tackle the obesity epidemic.

The majority of published studies have found significant relationships between BMI and emotional eating (Braet & Van Strien, 1997; Braet *et al.*, 2008; Konttinen *et al.*, 2010; Van Strien *et al.*, 2009; Webber *et al.*, 2009) however there is some contrasting evidence (Masheb & Grilo, 2006; Snoek *et al.*, 2007). As far as the author is aware there is no other research that has investigated the relationship between emotional regulation strategies and BMI specifically.

It seems that research that has investigated emotional eating as a general term (rather than assessing specific emotions such as anger, anxiety and depression, as in the present study) has indicated that emotional eating may predict BMI. For example,

previous research has found that within a British sample of children aged between 7 to 12 years old that 5.3 *per cent* of the variance in BMI was explained by emotional eating (Webber *et al.*, 2009). In the present study, emotional eating contributed to only a small variance in BMI, and was a non-significant predictor. Therefore, one reason that previous research has found emotional eating to be related to BMI could be related to how emotional eating was measured. For example, the most common measure used in the literature to assess emotional eating has been the Dutch Eating Behaviour Questionnaire (Braet & Van Strien, 1997; Braet *et al.*, 2008; Van Strien *et al.*, 2009) while other studies have used the Three Factor Eating Questionnaire (Konttinen *et al.*, 2010) or the Child Eating Behaviour Questionnaire (Webber *et al.*, 2009). All of these studies have found significant relationships between emotional eating and weight. In contrast, the current study and Masheb and Grilo (2006) used measures that assessed whether participants ate in response to specific emotions and found no relationship. However, even within research that has measured eating in relation to emotions generally, significant findings are not always reported (Snoek *et al.*, 2007). Nevertheless, perhaps the current study was too limited in the types of emotions that were measured and that emotional eating generally rather than one specific emotional experience contributes to young people's weight.

Furthermore, research has indicated that children may not understand certain emotional terms which could limit their ability to report when or whether they eat in response to emotions. For example, Braet and Van Strien (1997) completed a pilot study to investigate if children aged between 9 and 12 years old could understand

emotional eating and they reported that children do not understand some emotional terms such as ‘irritated’ or ‘depressed’. Perhaps, this may have contributed to the current study finding no relationship between emotional eating and weight due to the adolescents’ ability to understand emotional terms, though the participants in the current study were older than those in the Braet and Van Strien study and the EES-C was validated with young people between the age of 8 and 18 from the US (Tanofsky-Kraff *et al.*, 2007) Nevertheless, the current study may have benefited from a pilot study to assess Scottish adolescents’ understanding of the EES-C scale.

It is also possible that using a community sample had an impact on some of these relationships being non-significant in the present study. There were only 7.5 *per cent* adolescents who were obese and 69.2 *per cent* who were non-obese. In particular, previous research looking at the relationships between BMI and emotional eating has used samples where nearly 50 *per cent* of participants were overweight and 50 *per cent* were not overweight (Braet & Van Strien, 1997; Van Strien *et al.*, 2009). Perhaps the lack of individuals falling into an obese category in the present study meant that a relationship between emotional eating and BMI was difficult to detect. Moreover, evaluating parenting, emotional eating, emotional regulation and lifestyle factors among clinically obese young people rather than a community sample could lead to different results due to less uniformity in scores within the sample. For example, comparing clinically obese adolescents to their non-overweight peers may reveal important differences in parenting practices.



Comparing differences between clinically obese or overweight young people and their peers may be especially useful to clinical psychology practice. Generally, clinical psychology services to young people with weight problems would be concerned with the more extreme end of this problem, i.e., those who are clinically obese. People with more serious clinical issues usually gravitate toward secondary care services and community work more commonly falls in the remit of public health. The latter are typically involved in trying to make small changes with large populations whereas the latter are usually trying to make large changes with a small number of people (a family or individual young person). Therefore, further evidence to clarify the contribution that parenting has on young people who are clinical obese would indicate if this should be addressed at this stage.

Whether or not it is generally the case that obesity is related to emotional eating (and the existing evidence suggests there may a relatively small but significant relationship), there may well be a strong link for specific patients. In these instances, clinical psychology departments would be an appropriate service for obese young people. A vast amount of a clinical psychologist's work is related to promoting young people's emotional wellbeing. They can help young people learn how to manage their emotions in a more adaptive way. Although there was no relationship between emotion regulation and BMI in the present study, this may not be case within those presenting with clinical levels of obesity. In going back more than 50 years, Kaplan and Kaplan (1957) suggested that obese adults can overeat to reduce anxiety. This may be temporarily successful at reducing their anxiety however in the

long term of course this may have a negative impact on weight and mood (Canetti *et al.*, 2002).

The current study did not find a relationship between emotion regulation and weight. Previous research has suggested a relationship between depression and anxiety and weight (Anderson *et al.*, 2007; Goodman & Whitaker, 2002; Luppino *et al.*, 2010). Perhaps it is the case that these young people have experienced more severe trauma or stress in their lives which might be unrelated to how they manage their emotions. On the other hand, it might be the case that these individuals are using food as a coping mechanism to manage the negative effect and in an attempt to reduce the stress in their lives (Bruch, 1973; Kaplan & Kaplan, 1957; Zimetkin *et al.*, 2008) and in the long term this coping strategy leads to weight gain. This appears to occur in other eating disorders such as bulimia nervosa; it has been suggested that periods of binge eating temporarily reduce negative emotions in the short term due to the feeling of release when eating and the positive affect that is associated with this (Fairburn, 2000). The limitations of the current study which will be discussed later in section 4.3 (such as community sample, sample size, method of measurement, study design) may have all contributed to the non-significant relationship in the current study findings and these need to be taken into account when making inferences about whether emotion regulation strategies are related to weight.

The present study found that healthy food habits, exercise and emotional eating did not predict BMI. As far as the author is aware, there are no other studies that

evaluated whether BMI can be predicted by healthy food habits, exercise and emotional eating, when taking these factors together. Instead, the literature has evaluated the relationships between these variables and weight separately and reported that weight is related to energy intake (through diet) (Aeberli *et al.*, 2007; Bleich *et al.*, 2011; Hui *et al.*, 2003; Welsh *et al.*, 2005) and energy output (physical activity) (Abbot *et al.*, 2001; Manios *et al.*, 2009). However, studies that have assessed lifestyle factors such as energy intake and output that suggest there is a relationship between diet, exercise and weight assessed these variables with more specific measures. For example, diet has mainly been assessed through the use of diary format of calorie intake or types of foods eaten over a set period (Hui *et al.*, 2003; Aeberli *et al.*, 2007). However, the majority of studies have used self-report measures, which may introduce inaccuracies in recall or report.

The contribution of diet, exercise and emotional eating to weight requires to be studied further to develop current understanding of the influence of these variables on young people's weight. Many studies, like the current one, have used cross sectional designs that prevent the researcher to state the direction of the influence of the variables on each other. In the future, longitudinal research designs could be used with a wide variety of variables and this research design would be better placed to state the direction that variables had on BMI. If further evidence indicates that emotional eating along with diet and exercise is a significant factor contributing to weight among young people this could potential change current obesity interventions. It would indicate that young people's ability to manage their emotions

and lifestyle factors are required to be addressed in combination rather than alone which research has indicated is ineffective (Collins *et al.*, 2007; Harris *et al.*, 2009). Clinical psychologists would be well placed to address young people's emotional well-being. Until further research clarifies the contribution of emotional eating on weight in the context of other predictors it would not seem appropriate for clinical psychologists to contribute a significant amount of their time to address this issue if it was only explaining between 1 to 5.3 *per cent* of the variance of BMI.

#### **4.1.2 Relationships between parenting, emotion regulation, emotional eating and lifestyle**

The current study found that maternal authoritative parenting style was significantly positively related to adolescents' external and internal functional emotional regulation strategies. This possibly indicates that mothers who are warm, supportive and promote autonomy in adolescents (authoritative) have children with greater use of functional emotional regulation strategies. Maternal authoritarian parenting style was negatively related to internal dysfunctional and external functional emotional regulation strategies. This suggests that mothers who use psychological and behavioural control have children who use less internal dysfunctional emotional regulation strategies and less external functional emotional regulation strategies. These findings were in contrast to the expected result, as previous research has indicated that authoritarian parenting has a negative impact on children's emotional well-being (Hardeep-Lai *et al.*, 2009) and authoritative parenting style has a positive impact (Liem *et al.*, 2010). There were no other significant relationships between

maternal parenting style and emotional regulation strategies. Previous research suggests that authoritative parenting style and characteristics of this type of parenting style such as parental warmth, care and nurturance promotes young people's ability to regulate their emotions, while authoritarian parenting style (psychological control & coercive parenting) is positively related to difficulties in emotional regulation (Coplan *et al.*, 2009; Jaffe *et al.*, 2010; Manzeske & Stright, 2009; McEwen & Flouri, 2009; Walton & Flouri, 2010). The current study's findings are similar to Walton and Flouri (2010) which only assessed maternal parenting and Coplan *et al.*'s (2009) study of younger children. They found that maternal warmth was negatively related to children's difficulties in emotion regulation. This indicates that mothers who are perceived by their adolescent children as warm have fewer difficulties in regulating their emotions. Ultimately the children manage their emotions in an adaptive functional manner.

There was only one significant relationship found between paternal parenting style and adolescent emotional regulation strategies. Paternal authoritative parenting style was positively related to external dysfunctional emotional regulation strategies, suggesting that warm, supportive parenting and promotion of autonomy in fathers is associated with more use of external dysfunctional emotional regulation strategies in children. This indicates that paternal authoritative parenting style is a risk factor for adolescents using external dysfunctional emotional regulation strategies to manage negative emotion. Again, this finding is the opposite of what would have been expected based on current literature on parenting (Williams *et al.*, 2009). It might be

the case that maternal and paternal authoritative parenting style influences adolescents' use of emotion regulation strategies differently and that it is maternal authoritative parenting is a protective factor to enable young people to manage their emotions effectively.

There appears to be no agreed standard method to measure emotion regulation within studies investigating if parenting is related to emotion regulation. Some studies have used the Difficulties in Emotion Regulation (DERS) (e.g. McEwen & Flouri, 2009; Walton & Flouri, 2010) while others have used other measures (Coplan *et al.*, 2009; Manzeske & Stright, 2009) or investigated specific emotion regulation strategies (Betts *et al.*, 2009; Jaffe *et al.*, 2010) such as thought suppression, which is an internal dysfunctional strategy, and cognitive reappraisal, which is an internal functional emotion regulation strategy (Gross, 1998). As far as the author is aware, no other study has used the REQ which has been validated within a UK adolescent population. It might be due to this study not measuring more specific emotion regulation strategies that the study's findings were different from current literature.

Previous research has conducted research with a larger age range than the current study (age range 16-18 years old) and larger sample. For example, McEwen and Flouri (2009) and Walton and Flouri's (2010) age ranges were between 11-18 years old (sample size 203 participants) while other studies used 12-16 years old (Betts *et al.*, 2009) and Coplan *et al.* (2009) had sample size of 285. It might be the case that this study required there to be a larger range of ages and larger sample to find similar

results to previous research and that the current findings are only specific to the older adolescents. All the relationships reported are based on cross sectional analysis and that means these findings cannot state the direction of the influence. Therefore, parenting could be influencing adolescents' emotional regulation as suggested by the author, or it could be that young people's emotional regulation strategies could be impacting on parenting or that another variable relates to emotion regulation and parenting which may explain the relationship.

It is important to continue to evaluate the contributing factors that mothers and fathers have on children and adolescents' emotional regulation. If there are differences as the current study suggests, or if they are in fact similar as current literature indicates, these require to be further explored to inform a clinical psychologist's clinical practice. Clinical psychologists regularly work with children and young people who have difficulties in managing their emotions which can present in a variety of ways for example aggressive behaviour, low mood, anxiety or excessive weight. Often the interventions involve parents to enable them to parent their children in a different way to promote their children's psychological functioning. Therefore, if mothers and fathers influence their children's emotion regulation differently this needs to be addressed at the intervention stage.

There were no significant relationships found between parenting style and emotional eating. There is limited research that has investigated the relationship between parenting style and emotional eating. Current research has indicated that mothers'

authoritative parenting style is protective against children engaging in emotional eating (Topman *et al.*, 2011). Furthermore, there is some evidence that parenting practices that are indicative of authoritative parenting style such as support, warmth and reasoning may lead to children eating less in response to emotions (Snoek *et al.*, 2007; Topman *et al.*, 2011). As previously discussed, it seems that studies that have assessed emotional eating generally rather than investigating specific emotions have also found relationships between parenting and emotional eating. For example, Snoek *et al.* (2007) and Topman *et al.* (2011) both assessed emotional eating using the DEBQ. This may contribute to the discrepancy between these findings and those of the current study. Furthermore, Topman *et al.* (2011) interviewed children to ensure their understanding of emotional eating while the current study used self-report measures, which was thought to be suitable due to the age of adolescents being between 16-18 years old. Therefore, interviewing the adolescents may have ensured their understanding about emotional eating. However, the researcher and a teacher who was familiar to the adolescents were present and available to answer questions during the completion of the questionnaire.

Previous studies had larger sample sizes compared to the current study, which may contribute to the reason that this study found no significant relationships between parenting style and emotional eating. Topman *et al.*'s (2011) study found that maternal parenting style was negatively related to emotional eating in a sample of 450 children aged between 6 and 8 years old, with an effect size of .16. The current study's effect sizes of .17 and .14 for the relationships between maternal



authoritative parenting style and eating in response to feeling depressed and eating in response to anxiety, anger and frustration are similar in size; therefore perhaps if this study had a larger sample size and had adequate power then it may have also found a significant result.

The research investigating if parenting is related to emotional eating is in its infancy and requires further research to explore this further. Currently, it seems that parenting may influence young people to eat in response to emotions and, as previously discussed the literature is pointing towards emotional eating being related to weight (section 1.8.2). Taken together the literature suggests that parenting might be an important component to address within interventions aiming to tackle obesity among young people (although the current study did not support this). Although, for clinical psychologists or public health professionals to devote resources towards interventions targeting parenting to address young people's emotional eating and weight they would require more substantial evidence to support these variables being associated and likelihood of making a difference to young people's health.

The current study found that maternal and paternal authoritative parenting style was significantly negatively related to adolescents' weekly sedentary behaviour. This indicates that mothers and fathers' authoritative parenting style leads to adolescents engaging in less sedentary behaviour. Furthermore, it was found that adolescents' healthy food habits were positively significantly related to internal functional and external dysfunctional emotion regulation strategies. These findings suggest that

adolescents who use internal functional or external dysfunctional emotion regulation strategies eat healthier. It is difficult to interpret these and further research is required to validate the current study's findings. The above findings need to be viewed with caution as this analysis is cross sectional and it is not possible to state the direction of influence.

As far as the author is aware there is no research that has looked at the relationship between healthy eating and emotional regulation and limited research that has investigated the relationship between parenting style and sedentary behaviour. Previous research suggests that restrictive parenting towards sedentary behaviour increases children's engagement in sedentary behaviour (Arredondo *et al.*, 2006; Gubbels *et al.*, 2011) and that parental monitoring and reinforcement encourages children to engage in more physical activity (Arredondo *et al.*, 2006). These findings suggest that parental behaviour related to authoritative parenting style promotes children's engagement in physical activity and that non authoritative parenting promotes sedentary behaviour. The wider research literature and current study are in agreement with their suggestion that parenting may impact on children's engagement in sedentary behaviour. However, as the literature is limited in the diversity of the population and the amount of research conducted in this area it is not possible to draw any firm conclusions.

## **4.2 How research findings can contribute to clinical practice**

Throughout the previous section the current study's findings, whether they were significant or not, were discussed in terms of how they may impact on clinical psychologists' clinical practice. These will be re addressed here. The current study had a low percentage of adolescents who were clinically overweight or obese and again this would limit the generalisation of the findings to a clinical population, which are the group of young people a clinical psychologist would typically directly work with. It is often the case that the less severe clinical problems are addressed initially within Public Health Services within the community.

The current study found that BMI was not predicted by healthy food habits, exercise or emotional eating. It would appear from this that interventions aimed to reduce weight would not benefit from addressing these variables. However, these findings are in contrast with previous research; therefore due to the limitations related to this study (which will be discussed in the following section) it might be the case that that these variables do predict BMI. It is very common for clinical psychologists to work with young people to help them learn to regulate their emotions in adaptive ways and it would seem there is an indication from current research that emotional eating is related to obesity. Therefore, further research is required to clarify if this is the case and to provide the evidence base to confirm that addressing emotional eating would impact young people's weight and this then would justify clinical psychologists' dedicating their time to obesity services. Albeit, if further research confirmed that emotional eating contributed a relatively small percentage to the understanding of

adolescents' weight it would be appropriate for clinical psychologists to provide supervision to other professionals to enable them to carry out psychological interventions and this would reduce the amount of time that clinical psychologists would need to provide.

Furthermore, the current study was in agreement with previous research that maternal authoritative parenting was related to young people's functional internal and external emotional regulation. This suggests that warm, supportive maternal parenting and the promotion of autonomy enables young people to manage their emotions appropriately. As part of clinical psychologists' formulation of young people's presenting problems it is essential to consider the family environment and parenting on the development of emotional difficulties (Carr, 2008). The research provides support for clinical psychologists to consider the promotion of authoritative parenting style within a clinical intervention to address adolescents' emotional difficulties. It would seem that from the current study that there are differences in how mothers and fathers impact on their children and adolescents' emotional regulation. Further research is required to confirm or disconfirm if there are differences to further develop clinical psychologists' clinical practice.

### **4.3 Strengths and limitations of the current study**

#### **Limitations**

##### **4.3.1 Design**

A limitation of the current study is that a cross-sectional design was used. The conclusions that have been drawn are limited due to the inability to conclude the causality and the direction of influence that of each variable. By using a cross-sectional design it is not possible to state the direction of the effect. The current study's findings are limited due to a small sample size and it might be the case that the study was underpowered. In comparison to Topman *et al.*'s (2011) significant findings, the current study had a smaller sample size and had similar correlations; therefore it might be the case that the study was underpowered for some of the analyses. The researcher was dependent on the young people volunteering to participate in the study during a period that they were busy in preparing for exams therefore this may have reduced the motivation for participants to engage in the study and reduced the sample size.

##### **4.3.2 Sample**

The current study's participants were from a community sample rather than a clinical sample. As would be expected there was a low percentage of overweight and obese participants. Therefore, if this study had explored the relationships between BMI and parenting, emotional eating, emotional regulation and lifestyle factors among

overweight/obese and non-obese adolescents it may have found findings similar to previous research (Braet & Van Strien, 1997).

There was limited background information gathered about the adolescents who participated in the study. The main background information that was gathered was the adolescent's age. The age range of participants was limited to between 16 and 18 therefore the findings of this study are only relevant to this age group and it would not be appropriate to generalise to younger adolescents. It appears that previous research that has evaluated similar relationships has included a wider age range than the current study (Betts *et al.*, 2009; McEwen & Flouri, 2009; Walton & Flouri, 2010). Furthermore, previous research has also included information about social class, ethnicity, parental characteristics such as parental weight and education status and family structure i.e. single family, living with step father or step mother. As the study did not gather this information it is not possible to evaluate how these factors may influence an adolescent's weight. In particular, research has indicated that maternal weight is related to their children's weight (Danielzik *et al.*, 2002; Maffei *et al.*, 1998; Schaefer-Graf *et al.*, 2005) and that parental obesity doubles the risk of children being obese in adulthood (Whitaker *et al.*, 1997). However, Rhee *et al.*'s (2006) study controlled for ethnicity, education, income status and behaviour problems and found that these variables did not impact on the findings. They found authoritarian parents were more likely to be overweight than children whose parents were authoritative. Furthermore, it has been suggested that mothers who have low education are more likely to have overweight children and are less likely to recognise

when their children are overweight (Baughcum *et al.*, 2000). Perhaps, this indicates that the lack of awareness and limited knowledge may impact on mothers' ability to provide an environment that promotes children's healthy weight.

#### **4.3.3 Outcome measures**

There are several limitations to this study that are related to how variables were measured. For example, it was decided to assess emotional eating using EES-C as it evaluated whether children eat in response to feeling unsettled, feeling depressed or feeling anxious, angry or frustrated (Tanofsky-Kraff *et al.*, 2007). The aim of using this scale was to explore how different emotions may trigger adolescents to eat. Previous studies have used the Dutch Eating Behaviour Questionnaire (DEBQ) to assess when children or adolescents engage in emotional eating (Goossens *et al.*, 2009; Nguyen-Rodriguez *et al.*, 2009; Snoek *et al.*, 2007). This measures eating in response to emotions generally rather than eating in response to specific emotions. Perhaps, a questionnaire assessing emotional eating generally offers adolescents the opportunity to state when they eat in response to a combination of emotions and rather than eating in response to specific emotions which might be a more valid method to assess emotional eating.

There is no clearly preferred method in the literature to assess emotion regulation. The current study used the REQ assessed adolescents' use of internal and external emotional regulation strategies as a general term. Perhaps, this scale was too general

at assessing emotional regulation strategies and it may have been beneficial to focus on specific examples of emotional regulation strategies such as suppression of emotions, cognitive reappraisal and physical outbursts towards others or objects. For example, Evers *et al.* (2010) assessed the use of suppression and cognitive appraisal during an experimental study which assessed what emotional regulation strategies led women to comfort eat. If this study had explored adolescents' use of specific emotion regulation strategies (and found significant results) this may have been more useful for clinical practice as it would have been able to directly indicate the strategies that promote a healthy weight (i.e. non-obese). In addition, there are general difficulties in assessing emotion regulation strategies as adolescents may not be aware of all these, as some strategies might be unconscious (Gross, 1998).

The current study did not assess the adolescents' understanding of emotions and emotional eating and a pilot study may have clarified this. Therefore, if these adolescents were unsure of the terminology used in the EES-C and REQ this may have impacted on their responses. The REQ has been validated with adolescents within the UK. However, as far as the author is aware the EES-C has only been validated in a sample of children from the USA and not with a UK population (Tanofsky-Kraff *et al.*, 2007).

There does not appear to be an agreed tool in the literature to assess parenting style. The measure that the current study used may not have measured parenting specifically enough to evaluate parenting related to eating. It was decided to use the



PAQ to assess parenting style as it provided an overall assessment of whether parents were perceived as authoritative, authoritarian or permissive. However, other studies have investigated parenting dimensions such as warmth, support and behavioural or psychological control and parental feeding strategies rather than the general concept of parenting style which perhaps are more sensitive to relationships being related to BMI (Blisset & Haycraft, 2008; Farrow & Blisset, 2006; Montgomery *et al.*, 2006).

Furthermore, the current thesis specifically focused on parenting style, however another approach could have been to measure attachment style to assess the impact of parenting. A secure attachment promotes a young person's psychological development (Cummings & Cummings, 2002), whereas research has suggested that young people with insecure attachments are at risk of psychological difficulties such as eating disorders (Broberg *et al.* 2001) and depression (Graham & Easterbrooks, 2000). It would have been a useful approach to evaluate whether different attachment styles, as well as parenting styles, are related to adolescence's weight, to gain a more in-depth assessment of parenting. However, this was outwith the remit of this thesis.

Additionally, the current study was limited due to lifestyle factors being assessed generally instead of a diary format. As these were assessed generally it required the adolescents to provide an average answer to how healthily they eat on a weekly basis and their weekly exercise. This may have impacted on the accuracy of the reporting on these variables. It may have been more accurate if a diet and exercise diary was

requested to be recorded the week before the researcher met with the adolescents to complete the questionnaire pack and measure their BMI at school.

The questionnaire pack was self-reported by the adolescents only. The adolescents may have been influenced by social desirability or preconceptions about the study's aims when completing the questionnaires which may result in them answering the questions in a way they thought was expected of them. Also, through the use of one informant it may have led to shared rater bias which could have led to significant associations being found due to the adolescents reporting on the dependent and independent variables. Therefore, a multi-informant and multi method data collection methods may have provided a more detailed assessment of the variables. For example, adolescents, mothers and fathers could have been requested to report on parenting style. Also, observations and staff report questionnaires could have been used to assess emotional eating, parenting style and emotional regulation strategies. In addition, self-report and monitoring of activity would have provided a more comprehensive account of lifestyle behaviours. It has been recommended by Welk *et al.* (2000) that a variety of measures are used to assess activity levels. However, the researcher was confined by the limited time scale to conduct the data collection and some of these methods were not feasible.

Furthermore, the current study was limited due to no assessment of emotional problems (such as depression and anxiety) within the sample. This would have provided further information about the adolescents' emotional functioning. As far as

the author is aware there is limited research that has investigated emotional regulation strategies and weight however, there is some evidence to indicate that emotional problems are related to obesity. Therefore an assessment of emotional problems in addition to emotional regulation strategies may have provided some further understanding of the underlying emotional difficulties experienced by adolescents who were overweight or obese.

#### **4.3.4 The generalisation of the current study's findings**

The generalisation of the current study's findings is limited. This study was conducted with a limited number of adolescents, limited age range and using a community based sample within one specific area in Scotland. It would not be appropriate for the current study to state its findings were reflective of adolescents within the UK as the diversity of sample was inadequate.

#### **4.3.5 Strengths**

The current study had limitations and strengths and at times some points could be considered as strength and a limitation. One of the current studies strengths was that the researcher measured the adolescents' BMI instead of relying on self-reports. This ensured that the BMI that was being used to evaluate relationships between emotional eating, emotional regulation and parenting style was accurate. There have been mixed methodologies used in previous research from parent reports, to children

and adolescent reports and measured BMI. There is a concern that self-reported BMI will be under reported whereas measured BMI ensures the accuracy.

The current study assessed mother and father parenting style instead of focusing on maternal or general parenting which previous research has done. This is considered a strength as this study is contributing to developing the understanding of influences that each parent has on adolescents' psychological functioning. As far as the author is aware this is the first study that has investigated maternal and paternal parenting styles separately on adolescents' BMI, emotional eating, emotional regulation and lifestyle within a UK sample.

Furthermore, the current study added to current research by evaluating emotional eating by using a measure (EES-C) that assesses when adolescents eat in response to certain emotions rather than a general concept of emotional eating. Previous research has assessed emotional eating as a general concept (Goossens *et al.*, 2009; Nguyen-Rodriguez *et al.*, 2009; Snoek *et al.*, 2007). In addition, as far as the author is aware this is the first study that has evaluated both emotional eating and emotional regulation in the same study to explore whether these influence adolescents' weight. Again, this study had the potential to contribute to further development of our understanding of how emotional regulation strategies relate to adolescents' emotional eating and weight albeit it did not produce any significant findings.

On the one hand using one informant to assess these variables can be considered a limitation (discussed above) and it can also be considered strength for the following reasons. It has been indicated that children's evaluations of parenting are better indicators of parenting behaviour on children's psychological functioning than parents' evaluations. For example, Snoek *et al.* (2007) used multi-informants; adolescents, mother and father reported on adolescents' emotional eating and parenting. This study only found significant relationships between the variables when the adolescents had reported on their own emotional eating and their experiences of being parented. Other research supports this suggestion that children's reports rather than parents' evaluations of their own parenting have stronger relationships with weight and eating (Haines *et al.*, 2008; Keery *et al.*, 2006). The current study assessed parenting, emotional eating and emotional regulation strategies by adolescents reporting on these variables. This provides support that the adolescents' reports were adequate to assess emotional eating, emotional regulation strategies and perceived parenting. As emotional eating and emotion regulation are internal experiences it is expected that adolescents would be more suited to report on these variables than their parents.

#### **4.4 Future research**

The areas of future research have been discussed throughout this Chapter. These will be reviewed together. Future research would benefit from using a mixed method design. There is a debate in literature about the hierarchy of evidence and what is the best methodology to use. It has been suggested research should match the research design to the research question instead of assuming that random controlled trials are the best research methodology (Petticrew & Roberts, 2002). To evaluate the factors (processes) that influence BMI the use of mixed method design would enhance the understanding of psychosocial variables that are related to BMI. Furthermore, future research ideally would benefit from incorporating a longitudinal design to confirm the direction of the association that has been suggested in the literature between parenting and young people's weight.

Future research may consider incorporating multi measures and multi informants to assess parenting, emotional eating and emotional regulation. It appears that there is no set agreement on the best way to measure these. For example, future studies would benefit from comparing outcomes related to a measure of parenting style in general terms and constructs that measure parenting behaviours related to feeding, such as control and monitoring. Further research is required to aid the clarification of whether emotional eating generally, or specific emotions in particular are related to weight by measuring both of these variables. Also further research is required to assess whether emotion regulation strategies should measure specific emotional strategies or should use measures that assess generally internal and external

strategies. An inclusion of parental and young person's evaluations of parenting would help clarify who is the appropriate informant to evaluate the impact parenting has on young people's weight and eating (Berge *et al.*, 2010) or it could clarify which had the stronger relationship. If research was evaluating younger children (pre-school age) who were unable to comment on parenting, future studies could consider the use of observations.

To aid the development of successful interventions for young people's weight, future research would benefit in assessing the mechanisms that may explain the link between parenting and weight. From the current study's findings it appears that there is a large amount of variance in BMI that is unexplained. It has been proposed that environmental variables (such as social economic status, parental weight and ethnicity) may vary the risk of being overweight (Hughes *et al.*, 2008; Wake *et al.*, 2007) more than genetic risk factors (Rhee *et al.*, 2009). Research that has evaluated general parenting and weight has been equivocal. This might be related to general parenting being indirectly linked to young people's weight through eating and activity (Ventura & Birch, 2008). It would be helpful if future research could incorporate a larger amount of variables to further develop the knowledge of what may predict childhood obesity. For example, future research could explore the environmental and individual factors (activity and eating) to evaluate the influence these have on young people's weight within a clinical and community sample.

Future studies should examine the mechanisms that underlie emotional eating. There is a suggestion that emotional eating is a maladaptive method to manage negative affect. Further research is required to understand whether and what ineffective emotion regulation strategies (internally or externally) lead to obesity. Through this development it would inform prevention and interventions to address childhood obesity as it might be the case that these include components to help young people manage their emotions in an adaptive way.

Furthermore, along with developing the understanding of the variables that may relate parenting to an adolescent's weight, further research using experimental studies is required. It would be useful to evaluate when parenting or emotional regulation are addressed in interventions for overweight children and adolescents and to investigate whether this has a significant effect on a participant's weight. Even more important would be to evaluate whether changes can be maintained.

The current study reported limited findings within a community sample therefore future research is required to explore the psychosocial variables that are related to weight within a clinical population, as well community samples. Currently, there is limited research within a U.K. population exploring the relationships this study investigated between weight and parenting style, emotional eating, emotional regulation and lifestyle factors. Further studies investigating these variables would clarify the importance of these on childhood obesity.



It would be helpful if the research field could agree on one definition of obesity among young people. There is a large variation of the definitions used for overweight and obese young people within research. This makes the comparison of research studies difficult when they have used different definitions. Currently, in clinical practice it has been recommended by SIGN (2010) UK that BMI percentiles are used to assess overweight and obesity in children instead of ITOF. However, a variety of international research has used the ITOF to improve the ability to compare findings in the international field. However, there is the concern that using an international definition may not take into consideration individual country differences.

It has been identified by SIGN (2010) that further research is required to evaluate within a UK population the prevention and treatment strategies for obesity. There is currently no clear indication of the best approach to tackle obesity. Further research is required to evaluate the impact of strategies aim to improve motivation and behavioural change techniques which aim to change eating and physical activity. These should be evaluated in combination and separately to measure how each technique is contributing to the success of young people losing weight. Clinical psychologists are best placed to aid this evaluation as these techniques are based on psychological theories of motivational interviewing, behavioural and learning theory.

## **4.5 Conclusions**

This study found that BMI was not predicted by healthy eating habits, exercise or emotional eating. However, maternal and paternal authoritative parenting style was related to adolescents' use of functional emotional regulation strategies. This would suggest interventions aiming at improving adolescents' ability to use functional emotional regulation strategies should consider encouraging parents to use authoritative parenting behaviours such as being warm, responsive and demanding. These findings need to be viewed with caution due to limitations of the study. Future research is required to continue to evaluate the effect of psychosocial factors on adolescents' weight.

## REFERENCES

- Abbott, R., Ball, E.J., Baur, L.A., Davies, P.S.W., Gaskin, K.J., O'Conner, J., *et al.*, (2001). Total energy expenditure, body fatness and physical activity in children aged 6-9y. *American Journal of Clinical Nutrition*, 74, 524-528.
- Aeberli, I., Kaspar, M. & Zimmermann, M.B. (2007). Dietary intake and physical activity of normal weight and overweight 6 to 14 year-old Swiss children. *Swiss Medical Weekly*, 137, 424-430.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour & Human Decision Processes*, 50, 179-211.
- Andersen, R.E., Crespo, C.J. Bartlett, S.J., Cheskin, L.J. & Pratt, M. (1998). Relationship of physical activity and television watching with body weight and level of fatness among children. *Journal of American Medical Association*, 279, 938-942.
- Anderson, S.E., Cohen, P., Jacques, P.F., Naumova, E.N., Jacques, P.F. & Must, A. (2007). Adolescent obesity and risk for subsequent major depressive disorder and anxiety disorder: prospective evidence. *Psychosomatic Medicine*, 69, 740-747.
- Arnou, B., Kenardy, J. & Agras, W.S. (1992). Binge eating among the obese: a descriptive study. *Journal of Behavioural Medicine*, 15, 155-170.
- Arnou, B., Kenardy, J. & Agras, W.S. (1995). The emotional eating scale: The development of a measure to assess coping with negative affect by eating. *International Journal of Eating Disorders*, 18, 79-90.
- Arredondo, E.M., Elder, P.J. Ayala, G.X., Campbell, N., Baquero, B. & Duerksen, S. (2006). Is parenting styles related to children's healthy eating and physical activity in Latino families? *Health and Education Research: Theory and Practice*, 21, 862-871.

Atlantis, E., Barnes, E.H. & Singh, M.A.F. (2006). Efficacy of exercise for treating overweight in children and adolescents: a systematic review. *International Journal of Obesity*, 30, 1027-1040.

Bandura, A. (1997). *Self efficacy: the exercise of control*. Freeman: New York.

Baughcum, A.E., Chamberlin, L.A., Deeks, C.M., Powers, S.W. & Whitaker, R.C. (2000). Maternal perceptions of overweight preschool children. *Pediatrics*, 106, 1380-1386.

Baumeister, R.F. & Heatherton, T.F (1996). Self-regulation failure: an overview. *Psychological Enquiry*, 7, 1-15.

Baumeister, R.F., Heatherton, T.F., Todd, F. & Tice, D.M. (1994). *Losing control: how and why people fail at self-regulation*. San Diego: Academic.

Baumeister, R.F., Smart, L. & Boden, J.M. (1996). Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review*, 103, 5-33.

Baumrind, D & Black, A.E. (1967). Socialization practices associated with dimensions of competence in preschool boys and girls. *Child Development*, 38, 291-327.

Baumrind, D. (1965). Parental control and parental love. *Children*, 12, 230-234.

Baumrind, D. (1966). Effects of authoritative control on child behaviour. *Child Development*, 37, 887-907.

Baumrind, D. (1967). Childcare practices anteceding three patterns of preschool behaviour. *Genetic Psychology Monographs*, 75, 43-88.

Baumrind, D. (1971a). Current patterns of parental authority. *Developmental Psychology*, 4, 1- 103.

Baumrind, D. (1971b). Harmonious parents and their preschool children. *Developmental Psychology*, 4, 104-119.

Baumrind, D. (1978). Parental disciplinary patterns and social confidence and children *Youth Society*, 9, 239-276.

Baumrind, D. (1991). Parenting style on adolescent competence and substance use. *The Journal Early Adolescence*, 11, 56-95.

Berge, J.M., Wall, M., Loth, K. & Neumark-Sztainer, D. (2010). Parenting style as a predictor of adolescent weight and weight related behaviours. *Journal of Adolescent Health*, 46, 231-338.

Besson, H., Ekelund, U., Luan, J., May, A.M., Sharp, S., Travier, N., *et al.* (2009). A cross-sectional analysis of physical activity and obesity indicators in European participants of the EPIC-PANACEA study. *International Journal of Obesity*, 33, 497-506.

Betts, J., Gullone, E. & Allen, J.S. (2009). An examination of emotion regulation, temperament and parenting style as potential predictors of adolescent depression risk status: A correlation study. *British Journal of Developmental Psychology*, 27, 473-485.

Birch, L.L., Fisher, J.O., Grimm-Thomas, K., Markey, C.N., Sawyer, R. & Johnson, S.L. (2001). Confirmatory factor analysis of the Child Feeding Questionnaire: a

measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*, 36, 201-210.

Bjornely, S., Lydersen, S., Holmen, J., Nilsen, T.I.L. & Holmen, T.L. (2009). Sex differences in time trends were overweight and obesity and adolescents: the young-HUNT study. *Scandinavian Journal of Public Health*, 37, 881-889.

Bleich, S.N., Ku, R. & Wang. (2011). Relative contribution of energy intake and energy expenditure of childhood obesity: A review of the literature and directions for future research. *International Journal of Obesity*, 35, 1-15.

Blissett, J. & Haycraft, E. (2008). Are parenting style and controlling feeding practices related? *Appetite*, 50, 477-485.

Braet, C., Claus, L., Goossens, L., Moens, E., Van-Vlierberghe, L. & Soetens, B. (2008). Differences in eating style between overweight and normal weight youngsters. *Journal of Health Psychology*, 13, 733-743.

Braet, C. & VanStrien, T. (1997). Assessment of emotional, externally induced and restrained eating behaviour in nine to twelve year old obese and non-obese children. *Behaviour Research and Therapy*, 35, 863-873.

Brann, L.S. & Skinner, J.D. (2005). More controlling child feeding practices are found among parents of boys with an average body mass index compared with parents of boys with high body mass index. *Journal of American Dietetic Association*, 105, 1411-1416.

Broberg, A.G. Hjalms, I. & Nevenon, L. (2001). Eating disorders, attachment and interpersonal difficulties: A comparison between 18 to 24 year old patients and normal controls. *European Eating Disorders Review*, 9, 381-396.

Bruch, H. (1973). *Eating Disorders*. New York: Basic books.

Buri, J. R. Parental Authority Questionnaire. (1991). *Journal of Personality Assessment*, 57, 110-119.

Butte, N.F., Christiansen, E. & Sorensen, T.I.A. (2007). Energy imbalanced underlying the development of childhood obesity. *Obesity*, 15, 3056-3066.

Canetti, L., Bachar, E. & Berry, E.M. (2002). Food and emotion. *Behavioural Processes*, 60, 157-164.

Carr, A. (2008). *The handbook of child and adolescent clinical psychology: A contextual approach* (2<sup>nd</sup> edn). East Sussex: Routledge.

Clark-Carter, D. (2004). *Quantitative Psychological Research*. A Student's Handbook. UK, Psychology Press.

Cole, T.J., Bellizzi, M.C., Flegal, K.M. & Dietz., W.H. (2000). Establishing a standard definition for child overweight and obesity worldwide: International survey. *British Medical Journal*, 320, 1240-1243.

Cole.T.J., Flegal, M.K., Nicholls, D. & Jackson. A.A. (2007). Body mass index cut offs to define in children and adolescents: International survey. *British Medical Journal*, 2007, 335, 1-8.

Collins, C.E., Warren, J., Neve, M., McCoy, P. & Stokes, B.J. (2006). Measuring effectiveness of dietetic interventions and child obesity: A systematic review of randomised trials. *Archives of Paediatrics and Adolescent Medicine*, 160, 906-922.

Collins, C.E., Warren, J., Neve, M., McCoy, P. & Stokes, B.J. (2007). Systematic review of interventions in the management of overweight and obese children which

include a dietary component. *International Journal of Evidence-based Health Care*, 5, 2-53.

Cook, S., Weitzman, M., Auinger, P., Nguyen, M. & Dietz, W.H. (2003). Prevalence of Metabolic Syndrome phenotype and adolescents: Findings from the third national health and nutrition examination survey, 1988-1994. *Archives of Paediatric Adolescent Medicine*, 157, 821-827.

Coplan, R.J., Reichel, M. & Rowan, K. (2009). Exploring the associations between maternal personality, child temperament, and parenting: A focus on emotions. *Personality and Individual Differences*, 46, 241-246.

Cooper, L., Whitehead, L. & Boughton, N. (2004). Eating disorders. In J. Bennett-Levy., G. Butler., M. Fennell., A. Hackmann., M. Mueller. & D. Westbrook (Eds) *Oxford Guide to Behavioral Experiments in Cognitive Therapy* (Rev.edn.,pp.267-284). New York: Oxford University Press.

Crowther, J.H., Sanfter, J., Bonifazi, D.Z. & Shepherd, K.L. (2001). The role of daily hassles in binge eating. *The International Journal of Eating Disorders*, 29, 449-454.

Cruz. M.L., Weiensberg, M.J., Huang., T.T.K., Ball, G., Shaibi, G.Q. & Goran, M.I. (2004). The Metabolic Syndrome in overweight Hispanic youth and the role of insulin sensitivity. *Journal of Clinical Endocrinology Metabolic*, 89, 108-113.

Cummings, E.M. & Cummings, J.S. (2002). Parenting and attachment. In. M.H. Bornstein. (Eds) *Handbook of parenting: Volume 5 Practical Issues in Parenting* (Rev.edn., p.35-58). New Jersey: Lawrence Erlbaum Associates Publishers.

Czernichow, S., Lee, C.M.Y., Barzi, F., Greenfield, J.R., Baur, L.A., Chalmers, J., *et al.* (2010). Efficacy of weight-loss drugs of obesity and cardiovascular risk factors and obese adolescents: a meta-analysis of randomised controlled trials. *Obesity Reviews*, 11, 150-158.



Danielzik, S., Langnase, K., Mast, M., Stethmann, C. & Muller, M. (2002). Impact of parental BMI on the manifestation of overweight 5-7 year old children. *European Journal of Nutrition*, 41, 132-138.

Darling, N. & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, 113, 487-496.

de Onis, M., Blossner, M. & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *American Journal of Clinical Nutrition*, 92, 1257-1264.

Degnan, K.A., Fox, N.A., Henderson, H.A. & Rubin, K.H. (2008). Predicting social wariness in middle childhood: the moderating roles of child care history, maternal personality and maternal behaviour. *Social Development*, 17, 471-487.

Dennis, E.A., Flack, K.D. & Davy, B.M. (2009). Beverage consumption and adult weight management: A review. *Eating Behaviours*, 10, 237-247.

Department of health (2000). Diet and Nutrition Survey: young people aged 4 to 18 years. Volume 1: Report of the diet and nutrition survey. London: Department of Health.

Department of health (2010). National Diet and Nutrition Survey Headline results from Years 1 and 2 (combined) of the Rolling Programme (2008/2009 – 2009/10). London: Department of Health.

Ebbeling, C.B., Feldman, H.A., Osganian, S.K., Chomitz, V.R., Ellenbogen, S.J. & Ludwig, D.S. (2006). Effects of decreasing sugar sweetened beverage consumption on body weight in adolescents: a randomised controlled pilot study. *Paediatrics*, 117, 673-680.

Ekelund, U., Aman, J., Yngve, A., Renman, C., Westerterp, K. & Sjostrom, M. (2002). Physical activity but not energy expenditure is reduced in obese adolescents: A case-control study. *American Journal of Clinical Nutrition*, 76, 935-941.

Epstein, L.H, Wing, R.R., Woodall, K., Penner, B.C., Kress, M.J. & Koeske, R. (1985). Effects of family based behavioral treatment on obese 5 to 8 year old children. *Behavior Therapy*, 16, 205- 212

Epstein, L.H., Paluch, R.A., Roemmich, J.N. & Beecher, M.D. (2007). Family-based obesity treatment then and now: 25 years of paediatric obesity treatment. *Health Psychology*, 26, 381-391.

Evers, C., Stok, M.F. & de Ridder, D.T.D. (2010). Feeding your feelings: Emotional regulation strategies and emotional eating. *Personality and Social Psychology Bulletin*, 36, 792-804.

Fairburn, C.G. (2000). Eating disorders. In D.M. Clark & C.G. Fairburn (Eds.) *Science and Practice of Cognitive Behaviour Therapy* (Rev.edn., pp.209-241). New York: Oxford University Press.

Faith, M.S., Berkowitz, R.I., Stallings, V.A., Kerns, J., Storey, M. & Stunkard, A.J. (2004). Parental feeding attitudes and styles and child body mass index: Prospective analysis of a gene-environment interaction. *Paediatrics*, 114, 429-436.

Farrow, C & Blisset, J. (2006). Does maternal control during feeding moderate early infant weight gain? *Pediatrics*, 118, 293-298.

Field, A. (2005). *Discovering Statistics Using SPSS*. London: Sage Publications Inc.

Freedman, D.S. & Sherry, B. (2009). The validity of BMI as an indicator of body fatness and risk among children. *Paediatrics*, 124, 23-34.

Freedman, D.S., Dietz, W.H., Scrivivasan, S.R. & Berenson, G.S. (1999). The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study, *Paediatrics*, 103, 1175-1182.

Freeman, L.M.Y. & Gill, K.M. (2004). Daily stress, coping and dietary restraint in binge eating. *International Journal of Eating Disorders*, 36, 204-212.

Freud, S. (1946). *The ego and the mechanisms of defence*. New York: International Universities Press.

Garipey, G., Nitka, D. & Schmitz, N. (2010). The association between obesity and anxiety disorders in the population: a systematic review and Meta analysis. *International Journal of Obesity*, 34, 407-419.

Gaysina, D., Hotopf, M., Richards, M., Colman, I., Kuh, D. & Hardy, R. (2011). Symptoms of depression and anxiety and change in body mass index from adolescence to adulthood: results from a British birth cohort. *Psychological Medicine*, 41, 175-184.

Gibson, L.J., Peto, J., Warren, J.M. & Santos Silva, I.D. (2006). Lack of evidence on diets for obesity for children: a systematic review. *International Journal of Epidemiology*, 35, 1544-1552.

Gillis, L.J., Kennedy, L.C., Gillis, A.M. & Bar-Or, O. (2002). Relationship between juvenile obesity, dietary energy and fat intake and physical activity. *International Journal of Obesity Relations Metabolic Disorder*, 26, 458-463.

Golley, R.K., Magarey, A.M., Steinbeck, K.S., Baur, L.A. & Daniels, L.A. (2006). Comparison of metabolic syndrome prevalence using six different definitions in overweight pre-pubertal children enrolled in a weight management study. *International Journal of Obesity*, 30, 853-860.

Goodman, E. & Whitaker, R.C. (2002). A prospective study of the role of depression in the development and persistence of adolescent obesity. *Paediatrics*, 109, 497-504.

Goossens, L., Braet, C., Van Vlierberhe, L. & Mels, S. (2009). Loss of control over eating in overweight youngsters: the role of anxiety, depression and emotional eating. *European eating disorders review*, 17, 68-78.

Gordon-Larsen, P., The, N.S. & Adair, L.S. (2010). Longitudinal trends in obesity in the United States from adolescence to third decade of life. *Obesity*, 18, 1801-1804.

Government Office for Science (2007). *Foresight: Tackling Obesities: Future Choices- International Comparisons of Obesity Trends, Determinants and Responses- Evidence Review*. London: The Stationery Office.

Graham, C.A. & Easterbrooks, M.A. (2000). School-aged children's vulnerability to depressive symptomatology: The role of attachment security, maternal depressive symptomatology, and economic risk. *Development and Psychopathology*, 12, 201-213.

Green, S. B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research*, 26, 499-510.

Greenwood, N. & Tulloch, P. (2004). Working for a healthy city. *The Journal of the Chartered Institute of Library and Information Professionals in Scotland*, 2, [www.slainte.org.uk/publications/serials/infoscot/vol2\(3\)/vol2\(3\)article3.html](http://www.slainte.org.uk/publications/serials/infoscot/vol2(3)/vol2(3)article3.html). Retrieved on 27<sup>th</sup> September.

Gross, J.J. (1998). The emerging field of emotion regulation: an integrative review. *Review of General Psychology*, 2, 271-299.

Gross, J.J. (1999). Emotion regulation: past, present and future. *Cognition and Emotion*, 13, 551-573.

Gubbels, J.S., Kremers, S., Stafleu, A., de Vries, S., Goldbohm, R.A., Dagnelie, P.C., *et al.* (2011). Association between parenting practices and children's dietary intake, activity behaviour and development of body mass index: the KOALA birth cohort study. *International Journal of Behavioural Nutrition Physical Activity*, 8, 18-31.

Haines, J., Neumark-Sztainer, D. Hannan, P., & Robinson-O'Brien, R. (2008). Child versus parent report of parental influence on children's weight related attitudes and behaviours. *Journal of Pediatric Psychology*, 33, 783-788.

Hardeep-Lai, J., Mandeep, S. & Mehra, R.K. (2009). Depression among adolescents: Role of self efficacy and parenting style. *Journal of Projective Psychology and Mental Health*, 16, 13-17.

Harris, K.C., Kuramoto, L.K., Schulzer, M. & Retallack, J.E. (2009). Effect of school-based physical activity interventions on body mass index in children: A meta-analysis. *Canadian Medical Association Journal*, 180, 719-726.

Hasler, G., Pine, D.S., Kleinbaum, D.G., Gamma, A., Luckenbaugh, D., Ajdacic, V., *et al.* (2005). Depressive symptoms during childhood and adult obesity: the Zurich cohort study. *Molecular Psychiatry*, 10, 842-850.

Hassapidou, M., Fotiadou, E., Maglara, E. & Papadopoulou, S.K. (2006). Energy intake, direct composition, energy expenditure and body fatness of adolescence in Northern Greece. *Obesity*, 14, 855-862.

Heatherton, T.F. & Baumeister, R.F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, 110, 86-108.

Holmback, U., Fridman, J., Gustafsson, J., Proos, L., Sundelin, C. & Forslund, A. (2007). Overweight more prevalent among children than among adolescents. *Acta Paediatrica*, 96, 577-581.

Hughes, S.O., Power, T.G. Fisher, J.O., Mueller, S. & Nicklas, T.A. (2005). Revisiting a neglected construct: Parenting styles in a child-feeding context. *Appetite*, 44, 83-92.

Hughes, S.O., Shewchuk, R.M., Baskin, M.L., Nicklas, T.A. & Qu, H. (2008). Indulgent feeding style and children's weight status in preschool. *Journal of Developmental and Behavioural Paediatrics*, 29, 403-410.

Hui, L., Nelson, E.A.S., Yu, L.M. & Fok, T.F. (2003). Risk factors for childhood overweight in 6 to 7-year-old Hong Kong children. *International Journal of Obesity*, 27, 1411-1418.

International Obesity Task Force (2010) The Global epidemic. Retrieved from: [www.iaso.org/iotf/obesity/obesitytheglobalepidemic/](http://www.iaso.org/iotf/obesity/obesitytheglobalepidemic/). Accessed on 23<sup>rd</sup> July 2011.

Isomaa, B., Almgren, P., Tuomi, T., Forsen, B., Nissen, M., Taskinen, M.R., *et al.* (2001). Cardiovascular morbidity and mortality associated with the Metabolic Syndrome. *Diabetes Care*, 24, 683-689.

Jaccard, J., & Wan, C. K. (1996). *Lisrel approaches to interaction effects in multiple-regression*. Thousand Oaks, CA: Sage Publications.

Jaffe, M., Gullone, E. & Huges, E.K. (2010). The roles of temperamental dispositions and perceived parenting behaviours in the use of the two emotion regulation strategies in late childhood. *Journal of Applied Developmental Psychology*, 31, 47-59.

James, J. & Kerr, D. (2005). Prevention of childhood obesity by reducing soft drinks. *International Journal of Obesity*, 29, 54-57.

James, J., Thomas, P., Cavan, D. & Kerr, D. (2004). Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. *British Medical Journal*, 328, 1236-1242.

Janicke, D.M., Sallinen, B.J., Perri, M.G., Lutes, L.D., Huerta, M., Silverstein, J.H., *et al.* (2008). Comparison of parent only person's family-based interventions for overweight children underserved rural settings: outcomes from project STORY. *Archives of Paediatrics and Adolescent Medicine*, 162, 1119-1125.

Johnson, F., Wardle, J. & Griffith, J. (2002). The adolescent food habits checklist: Reliability and validity of a measure of healthy eating behaviour in adolescents. *European Journal of Clinical Nutrition*, 56, 644-649.

Johnson, W.G., Kirk, A.A. & Reed, A.E. (2001). Adolescent version of the questionnaire of eating and weight patterns: Reliability and gender differences. *International Journal of Eating Disorders*, 29, 94-96.

Joyce, J. & Zimmer-Gembeck, M.J. (2009). Parent feeding restriction and child weight. The mediating role of child disinhibited eating and the moderating role of the parenting context. *Appetite*, 52, 726-734.

Kaplan, H.I. & Kaplan, H. (1957). The psychosomatic concept of obesity. *Journal of Nervous and Mental Disease*, 125, 181-200.

Keery, H., Eisenberg, M.E., Boutelle, K., Neumark-Sztainer, D. & Story, M. (2006). Relationships between maternal and adolescent weight related behaviours and concerns: The role of perception. *Journal of Psychosomatic Research*, 61, 105-111.

Kenardy, J. Arnow, B. & Agras, W.S. (1996). The aversiveness of specific emotional states associated with binge-eating in obese subjects. *Australian and New Zealand Journal of Psychiatry*, 30, 839-844.

Konttinen, H., Mannisto, S., Sarlio-Lahteenkorva, S., Silventoinen, K. & Haukkala, A (2010). Emotional eating, depressive symptoms and self reported food consumption: A population study. *Appetite*, 54, 473-479.

Lamborn, S.D., Mounts, S.N., Steinberg, L. & Dornbusch, S.M. (1991). Patterns of competence and adjustment among adolescents from authoritative, authoritarian, indulgent and neglectful families. *Child Development*, 62, 1049-1065.

Lauer, R.M. & Clarke, W.R. (1989). Childhood risk factors for high adult blood pressure: the Muscatine study. *Paediatrics*, 84, 633-641.

Lauer, R.M., Lee, J. & Lauer, R.M. (1988). Factors affecting the relationship between childhood and adult cholesterol levels: The Muscatine study. *Paediatrics*, 82, 309-318.

Lazarus, R.S. & Folkman, S. (1984). Stress, appraisal and coping. New York: Springer.

Liem, J.H., Cavell, E.C. & Lustig, K. (2010). The influence of authoritative parenting during adolescence on depressive symptoms in young adulthood: Examining the mediation of roles of self-development and peer support. *The Journal of Genetic Psychology*, 171, 73-92.

Ludwig, D.S., Peterson, E.K. & Gortmaker, S.L. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *The Lancet*, 357, 505-508.



Luppino, F.S., de Wit, L.M., Bouvy, P.F., Stijnen, T., Cuijpers, P., Penninx, B.W.J.H., *et al.* (2010). Overweight, obesity and depression: a systematic review and meta-analysis of longitudinal studies. *Archives of General Psychiatry*, 67, 220-229.

Maccoby, E. E., & Martin, J. (1983). Socialization in the context of the family: Parent-child interaction. In P.H. Mussen, & E. M. Hetherington (Ed) *Handbook of child psychology: Vol. 4. Socialization, personality, and social development*. New York: Wiley.

Maffeis, C., Talamini, G. & Tato, L. (1998). Influence of diet, physical activity and parent's obesity on children's adiposity: a four year longitudinal study. *International Journal of Obesity*, 22, 758-764.

Malik, V.S., Schulze, M.B. & Hu, F.B. (2006). Intake of sugar sweetened beverages and weight gain: a systematic review. *American Journal of Clinical Nutrition*, 84, 274-288.

Manios, Y., Kourlaba, G., Kondaki, K., Grammatikaki, E., Anastasiadou, A. & Roma-Giannikou, E. (2009). Obesity and television watching in preschoolers in Greece: The GENESIS study. *Obesity*, 17, 2047-2053.

Manzeske, D.P. & Stright, A.D. (2009). Parenting styles and emotion regulation: The role of behavioural and psychological control during young adulthood. *Journal of Adult Development*, 16, 223-229.

Marshall, S.J., Biddle, S.J.H., Gorely, T., Cameron, N. & Murdey, I. (2004). Relationships between media use, body fatness and physical activity in children and youth: A meta-analysis. *International Journal of Obesity*, 28, 1238-1246.

Masheb, R.M. & Grilo, C.M. (2006). Emotional eating and its associations with eating disorder psychopathology among overweight patients with Binge eating disorder. *International Journal of Eating Disorders*, 39, 141-146.

McEwen, C. & Flouri, E. (2009). Father's parenting, adverse life events, and adolescents emotional and eating disorders symptoms: the role of emotion regulation. *European Child Adolescence Psychiatry*, 18, 206-216.

Meyer, T.A. & Gast, J. (2008). The effects of peer influence on disordered eating behaviour. *The Journal of School Nursing*, 24, 136-142.

Michie, S., Johnston, M., Francis, J.J., Hardeman, W. & Eccles, M.P. (2008). From Theory to Intervention: Mapping Theoretically Derived Behavioural Determinants to Behaviour Change Techniques. <http://hdl.handle.net/2164/302>

Mokdad, A.H., Ford, E.S., Bowman, B.A., Dietz, W.H., Vinicor, F. & Bales, V.S., *et al.* (2003). Prevalence of Obesity, diabetes, and obesity-related health risk factors, 2001. *Journal of the American Medical Association*, 289, 76-79.

Montgomery, C., Jackson, D.M., Kelly, L.A. & Reilly, J.J. (2006). Parental feeding style, energy intake and weight status in young Scottish children. *British Journal of Nutrition*, 96, 1149-1153.

Moskowitz, D.S. & Young, S.N. (2006). Ecological momentary assessment: What it is and why it is a method of the future in clinical psychopharmacology. *Journal of Psychiatry Neuroscience*, 31, 13-20.

National Centre for Health Statistics (2010). Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963–1965 Through 2007–2008. Retrieved from [www.superiorsurrogacy.com/nchs/data/hestat/](http://www.superiorsurrogacy.com/nchs/data/hestat/)

obesity\_child\_07\_08/obesity\_child\_07\_08.pdf. Accessed on 13<sup>th</sup> September 2011.

National Health Service (2009). Health survey for England 2009: Volume 1 health and lifestyles. England: National Health Service.

National Heart Lung and Blood Institute (2012a). What is Metabolic Syndrome? Retrieved from <http://www.nhlbi.nih.gov/health/health-topics/topics/ms/> Accessed on 28th January 2012.

National Heart Lung and Blood Institute (2012b). Cardiovascular Disease. Retrieved from <http://www.nhlbi.nih.gov/health/health-topics/topics/ms/> Accessed on 28<sup>th</sup> January 2012

National Institute for Clinical Excellence (2006). Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children. Clinical guideline 43. London: NICE.

Nguyen-Rodriguez, S.T., Unger, J.B., Spruitz-Metz, D. (2009). Psychological determinants of emotional eating in adolescents. *Eating Disorders*, 17, 211-224.

Ogden, J. (2004). *Health Psychology: A textbook* (3<sup>rd</sup> edn). USA: Open University Press.

Olvera, N. & Power, T.G. (2010). Brief report: parenting styles and obesity in Mexican American children: a longitudinal study. *Journal of Paediatric Psychology*, 35, 243-249.

Ouwens, M.A., Van Strien, T. & Van Leeuwe. (2009). Possible pathways between depression, emotional and external eating. A structural equation model. *Appetite*, 53, 245-248.

Patrick, H., Nicklas, T.A., Huges, S.O. & Morales, M. (2005). The benefits of authoritative feeding style: Caregiver feeding styles on children's food consumption patterns. *Appetite*, 44, 243-249.

Patton, G.C., Coffey, C., Carlin, J.B., Sawyer, S.M., Williams, J., Olsson, C.A., *et al.* (2011). Overweight and Obesity between adolescence and young adulthood: A 10 year prospective cohort study. *Journal of Adolescent Health*, 48, 275-280.

Petticrew, M. & Roberts, H. (2002). Evidence, hierarchies and typologies: horses for courses. *Journal of Epidemiology Community Health*, 57, 527-529.

Phillips, K.F.V. & Power, M.J. (2007). Assessment: A new self-report measure of emotion regulation in adolescents: The regulation of emotions questionnaire. *Clinical Psychology and Psychotherapy*, 14, 145-156.

Pine, D.S., Goldstein, R.B., Wolk, S. & Weissman, M.M. (2001). The association between childhood depression and adulthood body mass index. *Paediatrics*, 107, 1049-1056.

Pinhas-Hamiel, O., Dolan, L.M., Daniels, S.R., Standiford, D., Khoury, P.R. & Zeitier, D. (1996). Increase the incidence of non insulin dependent diabetes mellitus among adolescents. *Journal of Paediatrics*, 128, 608-615.

Propper, C. & Moore, G.A. (2006). The influence of parenting on infant emotionality: a multi level psychobiological perspective. *Developmental Review*, 26, 427-460.

Rhee, K.E., Lumeng, J.C., Appugliese, D.P., Kaciroti, N. & Bradley, R.H. (2006). Parenting styles and overweight status in first grade. *Paediatrics*, 117, 2047-2054.

Rocandio, A.M., Ansotegui, L. & Arroyo, M. (2001). Comparison of dietary intake among overweight and non-overweight schoolchildren. *International Journal of Obesity*, 25, 1651-1655.

Sacher, P.M., Kolotourou, M., Chadwick, P.M., Cole, T.J., Lawson, M.S., Lucas, A., *et al.* (2010). Randomised controlled trial of the MEND programme: a family-based community intervention in childhood obesity. *Obesity*, 18, 62-67.

Salvy, S.J., Romero, N., Paluch, R. & Epstein, L.H. (2007). Peer influence on Pre Adolescent Girls Snack Intake: Effects of Weight Status. *Appetite*, 49, 177-182.

Savoye, M., Shaw, M., Dziura, J., Tamborlane, W.V., Rose, P., Guandalini, C., *et al.* (2007). Effects of weight management program on body composition and metabolic parameters and overweight children: a randomised controlled trial. *Journal of American Medical Association*, 297, 2697-2704.

Schaefer-Graf, U.M., Pawliczak, J., Passow, D., Hartmann, R., Rossi, R., Christoph, B., *et al.* (2005). Birth weight and parental BMI predict overweight in children from mothers with gestational diabetes. *Diabetes Care*, 28, 1745-1750.

Scott, K.M., McGee, M.A., Wells, E. & Browne, M.A.O. (2008). Obesity and mental disorders and adult general population. *Journal of Psychosomatic Research*, 64, 97-105.

.

Scottish Executive (2003). Lets make Scotland more active: A strategy for physical activity: Physical Activity Task Force. Edinburgh: Scottish Executive.

Scottish Executive (2009). The Scottish Health Survey: Volume 1 main report. Edinburgh: Scottish Executive.

Scottish Executive (2010). Preventing overweight and obesity in Scotland: A route map towards healthy weight. Edinburgh: Scottish Executive.

Scottish Intercollegiate Guidelines Network (2010). Management of obesity: A national clinical guideline. Scotland: Scottish Intercollegiate Guidelines Network.

Senediak, C. & Spence, S.H. (1985). Rapid versus gradual scheduling of therapeutic contact in a family based behavioural weight control programme for children. *Behavioural Psychotherapy*, 13, 265-287.

Skinnner, B.F. (1963). Operant Behavior. *American Psychologist*, 18, 503-515.

Snoek, H.M., Engels, R.C.M.E., Janssens, J.M.A.M. & Van Strien, T. (2007). Parental behaviour and adolescents emotional eating. *Appetite*, 49, 223-230.

Snoek, H.M., van Strien, T., Janssens, J.M.A.M. & Engels, R.C.M.E. (2006). The effect of television viewing on adolescents snacking: Individual differences explained by external, restrained and emotional eating. *Journal of Adolescent Health*, 39, 448-451

.

Steinberg, L., Lamborn, S.D., Dornbush, S.M. & Darling, N. (1992). Impact of Parenting Practices on Adolescent Achievement: Authoritative Parenting, School Involvement and Encouragement to Succeed. *Child Development*, 63, 1266-1281.

Stern, M.P., Williams, K., Gonzalez-Villalpando, C., Hunt, K.J. & Haffner, S.M. (2004). Does the Metabolic Syndrome improve identification of individuals at risk of type 2 Diabetes and/ or Cardiovascular disease? *Diabetes Care*, 27, 2676-2681.

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128, 825-848.

Stunkard, A.J. & Waxman, M. (1980). Caloric intake and expenditure of obese boys. *Journal of Paediatrics*, 96, 187-193.

Sulkowskia, M.L., Dempsey, J. & Dempsey, A.G. (2011). Effects of stress and coping on binge eating in female college students. *Eating behaviors*, 12, 188-191.

Swinburn, B., Sacks, G. & Ravussin, E. (2009). Increased food energy supply is more than sufficient to explain the US epidemic of obesity. *American Journal of Clinical Nutrition*, 90, 1453-1456.

Tanofsky-Kraff, M., Theim, K.R., Yanovski, S.Z., Bassett, A.M., Burns, N.P., Ranzenhofer, L.M., *et al.* (2007). Validation of the emotional eating scale adapted for use in children and adolescents (EES-C). *International Journal of Eating disorders*, 40, 232-240.

Taylor, A., Wilson, C., Slater, A. & Mohr, P. (2011). Parenting and child body mass index: Longitudinal investigation of maternal and paternal influence. *Australian Journal of Psychology*, doi: 10.1111/j.1742-9536.2011.00024.x.

Thayer, R. (2001). *Calm energy: how people regulate mood with food and exercise*. Oxford: Oxford University press.

Topham, G.L., Hubbs-Tait, L., Rutledge, J.M., Page, M.C., Kennedy, T.S., Shriver, L.H., *et al.* (2011). Parenting styles, parental response to child emotion and family emotional responsiveness are related to child emotional eating. *Appetite*, 56, 261-264.

Treadwell, J.R., Sun, F. & Schoelles, K. (2008). Systematic review and meta-analysis of bariatric surgery for paediatric obesity. *Annals of Surgery*, 248, 763- 776.

Turner, E.A., Chandler, M. & Heffer, R.W. (2009). The influence of parenting styles, achievement motivation and self efficacy in academic performance on college students. *Journal of College Student Development*, 50, 337-346.

Van Strien, T., Herman, P.C. & Verheijden, M.W. (2009). Eating style, overeating and overweight in a representative Dutch sample. Does external eating play a role? *Appetite*, 52, 380-387.

Vartanian, L.R., Schwartz, M.B. & Brownell, K.D. (2007). Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *American Journal of Public Health*, 97, 667-675.

Ventura, A.K. & Birch, L.L. (2008). Does parenting affect children's eating and weight status? *International Journal of Behavioural Nutrition and Physical Activity*, 5, 5-15.

Viner, R.M., Hsia, Y., Tomsic, T., & Wong, I.C.K. (2010). Efficacy and safety of anti-obesity drugs in children: Systematic review and meta-analysis. *Obesity Reviews*, 11, 593-602.

Wake, M., Nicholson, J.M., Hardy, P. & Hardy, P. (2007). Preschoolers in obesity and parenting styles of mothers and fathers: Australian national population study. *Paediatrics*, 120, 1520-1527.

Walton, A. & Flouri, E. (2010.). Contextual risk, maternal parenting and adolescent externalizing behaviour problems: The of emotion regulation. *Child: Care, Health and development*, 36, 275-284.

Wang, Y., Monteiro, C. & Popkin, B.M. (2002). Trends of Obesity and Underweight in Older Children and Adolescents in the United States, Brazil, China and Russia. *American Journal of Clinical Nutrition*, 75, 971-977.

Wardle, J., Marsland, L., Sheikh, Y., Quinn, M., Fedoroff, I. & Ogden, J. (1992). Eating style and eating behaviour and adolescents. *Appetite*, 18, 167-183.

Waxman, M. & Stunkard, A.J. (1980). Caloric intake and expenditure of obese boys. *Journal of Paediatrics*, 96, 187-193.



Webber, L., Hill, C., Saxton, J., Van-Jaarsveld, C.H.M. & Wardle, J. (2009). Eating behaviour and weight in children. *International Journal of Obesity*, 33, 21-28.

Wegner, D.M., Schneider, D.J., Carter, S.R. & White, T.L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology*, 53, 5-13.

Wegner, D.M., Smyth, J.M., Crosby, R.D., Wittrock, D., Wonderlich, S.A. & Mitchell, J.E. (2002). An evaluation of the relationship between mood and binge eating in the natural environment using ecological momentary assessment. *International Journal of Eating Disorders*, 32, 352-361.

Weiss., Dziura, J., Burgert, T.S., Tamborlane, W.V., Takasli, S.E., Yeckel, C.W., *et al.* (2004). Obesity and the Metabolic Syndrome in children and adolescents. *The New England Journal of Medicine*, 350, 2362- 2374.

Welk, G.J., Corbin, C.N. & Dale, D. (2000). Measurement issues in the assessment of physical activity in children. *Research Quarterly for Exercise and Sport*, 71, 59-73.

Welsh, J.A., Cogswell, M.E., Rogers, S., Rockett, H., Mei, Z. & Grummer-Strawn, L.M. (2005). Overweight among low income preschool children associated with consumption of sweet drinks: Missouri, 1999-2002. *Paediatrics*, 115, 223-229.

Westerterp, K.R. Meijer, G.A.L, Janssen, E.M.E, Saris, W.H.M. & Hoor, F.T. (1992). Long term effect of physical activity on energy balance and body composition. *British Journal of Nutrition*, 68, 21-30.

Whitaker, R.C., Wright, J.A., Pepe, M.S., Seidel, K.D & Dietz, W.H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine*, 13, 869-873.

Whitlock, E.P., O'Connor, E.A., Williams, S.B., Beil, T.L. & Lutz, K.W. (2008). Effectiveness of Weight Management Programs in Children and Adolescents. Evidence Report/Technology Assessment No. 170. Rockville:Oregon Evidence-based Practice Center.

Williams, L.R., Degnan, K.A., Perez-Edgar, K.E., Henderson, H.A., Rubin, K.H., Pine, D.S., *et al.* (2009). Impact of behavioural inhibition and parenting style on internalising and externalising problems from early childhood through to adolescents. *Journal of Abnormal Child Psychology*, 37, 1063-1075.

Wood, J.J., McLeod, B.D., Sigman, M., Hwang, W. & Chu, B. (2003). Parenting and childhood anxiety: theory, empirical findings and future directions. *Journal of Child Psychology and Psychiatry*, 44, 134-151.

World Health Organisation (2011). Diabetes: Fact sheet number 312. Retrieved from [www.who.int/mediacentre/factsheets/fs312/en/](http://www.who.int/mediacentre/factsheets/fs312/en/) Accessed on 10<sup>th</sup> October 2011.

Zametkin, A., Jacobs, A.J. & Parrish, J. (2008). Treatment of children and adolescents with obesity and comorbid psychiatric conditions. In E. Jelalian & R.G. Steele (Eds.) *Handbook of childhood and adolescent obesity*. (Rev.edn., pp.425-443). USA: Springer.

Zhao, G., Ford, E.S., Dhingra, S., Strine, T.W. & Mokdad, A.H. (2009). Depression anxiety among US adults: associations with body mass index. *International Journal of Obesity*, 33, 257-266.

## **Appendix I**

### **University of Edinburgh Ethics Approval**

**UNIVERSITY OF EDINBURGH / NHS (SCOTLAND) CLINICAL  
PSYCHOLOGY TRAINING COURSE**

**Research Ethics Meeting 11<sup>th</sup> January 10**

**Present**

Ethel Quayle  
Emily Newan  
Suzanne O'Rourke  
Jill Cossar  
Paul Morris  
Karen McKenzie

**Apologies**

Lindsey Murray

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**Arlene Ross**

Arlene had not submitted her proposal in sufficient time to be read for the meeting. Given that the submission is to be in August 2010 it was felt appropriate to ask for electronic feedback. This is a summary of the feedback given and should be discussed with the thesis supervisor.

This was felt to be an interesting and worthwhile proposal. The following concerns were raised:

**Ethical issues**

1. Concern was expressed that high school pupils might be very self conscious about taking part in research of this subject matter in school and whether the over-weight pupils would actively avoid it. Could you recruit from alternative locations, such as local weight-watchers groups? They allow young people from aged 10 upwards. Alternatively, could the forms be completed by the children at home and returned to the researcher?
2. If the location has to be school, could the measures potentially upset any of these young people and, if so, are procedures in place to appropriately deal with such distress (these presumably may be using within-school resources)?
3. Presumably some pupils may have lost a parent recently or have other reasons for why such questions may cause distress (e.g. history of abuse or

current abuse). It would be useful to see evidence of such issues having been taken into consideration.

## Research

4. The research questions would benefit from greater clarification. Are directions of relationship anticipated between certain parenting styles and BMI / emotional regulation/eating style? There currently seems to be the potential for a very wide number of comparisons. Some clarification of the relationships that are of primary interest and anticipated directions would be beneficial.
5. It is not clear what all of the individual constructs are, how these are incorporated into the research questions and how these are to be measured. Each of these would seem essential to enable evaluation of the methods.
6. Would it be important to control for the impact of temperament on emotion regulation? (e.g. Early Adolescent Temperament Questionnaire, Short Form (EATQ-SF; Ellis & Rothbart, 1999).
7. PSE classes are timetabled frequently in the early years of high school, but come fifth year (with increasing academic demands) most high schools only offer a couple of sessions on this, so it would be important to think about the feasibility of this or consider an alternative class/ setting.
8. The CDI is validated for use on children between 7-17, so I wonder if a better measurement of depression could be found? The HADS has been validated for use with an adolescent population, see below: Validation of the Hospital Anxiety and Depression Scale for use with adolescents D White, C Leach, R Sims, M Atkinson and D Cottrell The British Journal of Psychiatry 175: 452-454 (1999)
9. The power calculation might be incorrect. If it is based on  $50 + (8 \times 16)$  then it would be 178 (not 194).

There has been recent research criticising BMI as a measure in diet/weight/health research. Catherine Smyth looked at weight/obesity and noted in her thesis that 'Recent developments in measuring weight suggest that BMI is an inaccurate measure. It has recently been suggested that measuring waist circumference or waist/hip ratio is a more effective measure of cardiovascular health risk than can be determined from BMI. Although further investigation is required, there is some evidence to suggest these measures are comparable (Vazquez et al.,2007).'The reference is: Vazquez, G., Duval, S., Jacobs, D. R., Jr. & Silventoinen, K. (2007) Comparison of body mass index, waist circumference, and waist/hip ratio in predicting

## **Appendix II**

### **Thesis Ethics Proposal form**

(Ethical Committee comments were addressed, and the email at the end of this appendix confirms the project received approval)



## **Doctorate in Clinical Psychology**

### *Thesis Ethics Proposal*

(IRAS derived version)

Provisional Thesis Title: An investigation of parenting style and weight in adolescence

Trainee Name: Arlene Ross (within this document is referred to as the researcher)

### Proposed Thesis Project Supervisors

Clinical: Dr Andy Keen

Possible Academic 1: Dr Emily Newman

Possible Academic 2

Other (if applicable)

Proposed setting: In secondary schools in the Grampian

Anticipated Month & Year of Submission of Thesis: 1<sup>st</sup> August 2010

**Please Note:** Most of the questions in this form are deliberately identical to questions contained in the NHS IRAS Research Ethics form. The corresponding ethics form question numbers are given in parentheses. Thus if the proposal is satisfactory, answers completed here may be pasted directly into the ethics forms.

Version (date): 11<sup>TH</sup> January 2009

### **Overview of the Research**

- 1) Please provide a brief summary of the research (maximum 300 words) using language easily understood by lay reviewers and members of the public (IRAS A6-1)

Previous research has found a link between parenting style and BMI, but this has not yet been studied within a UK adolescent population. Research has also shown a link between emotional eating and childhood obesity. However, the association between emotional regulation and obesity has not been investigated. The aim of the present study is therefore to establish the relationships between parenting style, emotional regulation, emotional eating and BMI in an adolescent population. I intend to distribute questionnaires to young people, over the age of 16, to measure parenting style, emotional regulation and emotional eating to investigate the relationship between these factors. I will measure the adolescents' height and weight to provide a measure of their BMI to investigate how this relates to the factors mentioned above.

- 2) Please summarise the main ethical and design issues arising from the study and say how you have addressed them. (IRAS A6-2)

The main ethical issue with this research is that the adolescents may want to discontinue their participation in the study as they complete the questionnaire pack due to them answering questions related to their parents and their own eating



behaviour. It will be made explicit to them that they can withdraw from the study at any point in time. Additionally, they might be concerned about their weight and height measurements being taken. To protect confidentiality this will be done in a private room by the researcher, Arlene Ross.

- 2) What is the scientific justification for the research? ( in language comprehensible to a lay person.) (IRAS A12)

### Parenting style and BMI

The prevalence of obesity in the UK is increasing and is associated with physical and psychosocial health problems (Reilly & Dorothy, 1999; McDowell *et al.*, 2003). Therefore it is important to consider the factors that are contributing to children becoming obese to inform preventive strategies and intervention programmes for obesity. The literature indicates that certain parenting styles might be related to childhood obesity. Authoritarian parents are described as being highly demanding when feeding and nonresponsive to the child while authoritative parents are actively encouraging in a supportive manner for example encouraging eating by reasoning and offering a choice (Hughes *et al.*, 2008). Indulgent parents place low demands on the child to eat but are supportive when they do. Permissive parents also make few demands but are also unsupportive to children (Hughes *et al.*, 2008). Permissive parenting style has been associated with low monitoring of children's food intake (Bisset & Haycraft, 2008) and a higher rate of obesity compared to authoritative parenting style (Hughes *et al.*, 2008; Hughes *et al.*, 2005; Ontai *et al.*, 2009). Furthermore, authoritarian parenting has been associated with increased pressure to eat (Hughes *et al.*, 2005) and obesity (Ontai *et al.*, 2009), though related to lower weight than indulgent parenting style (Biskin *et al.*, 2009). The limited research that has investigated mother and father's parenting style has found that only father's parenting style is related to higher BMI in preschool children (Wake *et al.*, 2007). Overall' the literature indicates that permissive and authoritarian parenting styles have a negative effect on childhood obesity and authoritative parenting style is protective against it (Enten & Golan, 2007). There appears to be a link between parenting style and a child's BMI however there is limited research investigating maternal and paternal parenting style on BMI. I aim to explore this relationship further.

### Parenting style, emotion regulation and emotional eating

The mechanisms through which parenting style influences BMI are unknown. One possibility is that parenting style is related to ways of managing emotions.

Emotional eating describes a tendency to eat in response to emotions, and is a method used by some to cope with distress (Braet & Van Strien, 1997). Emotional eating is associated with emotional distress in 17 to 25 year olds (Cox *et al.*, 1995). Emotional eating has been found to be significantly related to anxiety and depression in overweight children between the age of 8 and 18 Goosens *et al.* (2009). Furthermore, obese children between the age of 9 and 12 were more vulnerable to emotional and external eating (eating in response to external rather than internal hunger cues) than non obese children (Braet & Van Strien, 1997). These findings indicate that children who are overweight engage in emotional eating. There appears to be relationship between emotional eating and emotional wellbeing. Theoretically, adolescents who lack the ability to regulate effectively their emotions, are especially vulnerable to emotional eating because they must find alternative ways of dealing with emotional distress (Kostiuk & Fouts, 2002). Biskin *et al.* (2009) have suggested that authoritative parenting promotes self regulation of emotions and eating behaviour, resulting in normal weight gain; however as far as the author is aware this has not been tested. Therefore, the ability to self-regulate emotions may well be a promising area for research on adolescent weight problems, and the relationship between parenting style, emotional regulation and emotional eating could be explored.

There is limited research exploring the relationship between parenting style and emotional eating. Brazelier *et al.* (2007) reported that perceived pressure and restriction to eat was significantly related to emotional eating in a sample of 7 to 12 year old boys. In addition, parental support has been found to be negatively associated with emotional eating and parental psychological control was positively related to emotional eating in an adolescent sample (Snoek *et al.*, 2007). The research did not specifically investigate parenting styles but restrictive and controlling parenting strategies are aspects of Authoritarian parenting styles while support is represented in authoritative parenting style. Therefore it appears that different components of parenting style are related to emotional eating. This research aims to evaluate the relationship between parenting style and emotional eating further. As previously discussed emotional eating has been related to emotional wellbeing; however to the researcher's knowledge no research has investigated the relationship between emotional eating and parenting style. I suggest that the mediator between parenting style and emotional eating is emotional regulation (Kostiuk & Fouts, 2002). See figure 1. I aim to investigate this relationship.

#### Parenting style, life style factors and BMI

Parenting style may also be linked to BMI through lifestyle factors. Research has indicated that lifestyle factors such as lack of exercise or the hours watching T.V is related to childhood obesity. Kaikkonen et al. (2009) found that children's limited physical exercise was related to being overweight in a population of seven year old children from Finland. However, Baine et al. (2009) found that there was no relationship between physical activity and obesity in a French sample of young people between the age of 11 and 18 years old. They found a significant relationship between sedentary behaviour, hours watching T.V, and obesity (Baine *et al.*, 2009). In addition, diet has been associated with obesity in children (Ontai *et al.*, 2009). It appears that there are mixed results for the relationship between physical exercise and obesity. I aim to explore whether parenting style, exercise, watching T.V, emotional eating, emotional regulation and diet predict BMI. See figure 2.

In summary, research indicates that: parenting style is related to BMI in children; paternal parenting style may have a greater influence than maternal parenting style; there exists a significant relationship between emotional distress and the use of food to cope with emotional problems, and that compared to their non-overweight peers obese children have a higher incidence of emotional eating. However, as far as the researcher is aware, there is no existing research examining the relationship between parenting style and BMI in an adolescent population in the UK. Further, previous research has relied on parental reports of parenting style and not specifically investigated any differential effects of maternal and paternal parenting style. Moreover, there appears to be no research on the relationship among parenting style, adolescents' emotional regulation and emotional eating. The aim of the present study is to contribute to the existing research by investigating the relationship between these variables.

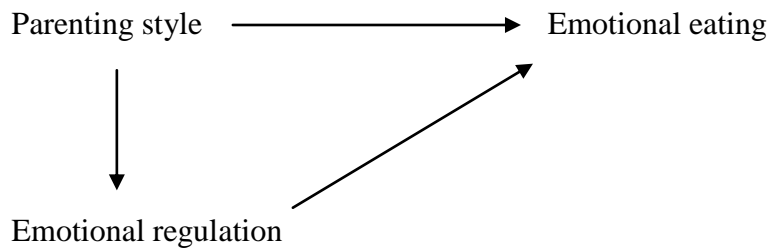
### **Purpose and Design of Research**

Research Questions / Objectives:

(Keep these focused and concise, with a maximum of five research questions).

4) What is the principal research question / objective? (in language comprehensible to a lay person) (IRAS A10)

### **Primary hypotheses**



**Figure 1**

I aim to test the associations between parenting style, emotional regulation and emotional eating. See figure 1.

1. Authoritarian and permissive parenting style will be positively related to emotional eating.
2. Authoritative parenting style will be negatively related to emotional eating.
3. Authoritarian and permissive parenting style will be related to internal-dysfunctional and external-dysfunctional emotional regulation styles.
4. Emotional regulation will mediate the relationship between parenting style and emotional eating.

The analysis I would use to test these associations would be multiple regressions. I would base my analysis on Baron & Kenny (1986) recommendations about mediator analysis to evaluate if emotional regulation is a mediator between parenting style and emotional eating. The sample size required for this analysis is 130 participants. This is based on Green's (1991) recommended calculation for multiple regression ( $N \geq 50 + (8 \times 10)$ ). The 10 variables are:

**Parenting style-** 6 subscales- Mothers Authoritative

Mothers Authoritarian

Mothers Permissive

Fathers Authoritative

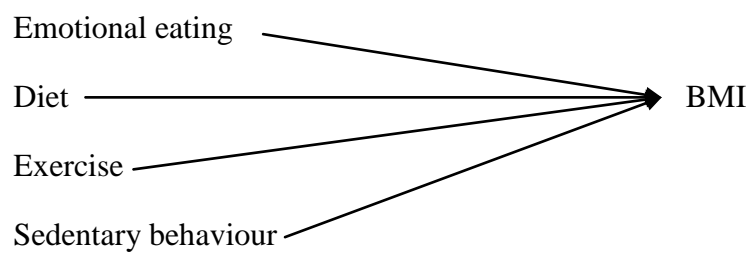
Fathers Authoritarian

## Fathers Permissive

**Emotional regulation- 4 scales** Internal dysfunctional  
External Dysfunctional  
Internal Functional  
External Functional

5) What are the secondary research questions / objectives if applicable? (in language comprehensible to a lay person) (IRAS A11)

### Secondary hypotheses



**Figure 2**

I aim to explore the relationship between these 4 constructs and BMI.

1. Emotional eating, diet, exercise and sedentary behaviour significantly predicts weight/ BMI

The method of analysis I would use is multiple regression to investigate if these factors predict BMI. The sample size that is required is 98 participants. This is based on Green (1991) recommended calculation for multiple regression ( $50 + (8 \times 6)$ ). The method of analysis I would use is multiple regression to investigate if these factors predict BMI. The 6 variables are:

<b>Emotional eating-</b> 3 subscales	Anxiety
	Depression
	Anger/Frustration
<b>Diet-</b> 1 scale	healthy eating
<b>Exercise-</b> 1 scale	amount of hours spent doing physical exercise in one week
<b>Sedentary behaviour-</b> 1 scale	amount of hours spent watching T.V and on a computer for leisure in one week

6) Please give a full summary of your design and methodology. It should be clear exactly what will happen to the research participant, how many times and in what order.

(Adapted from IRAS A13)

## Method

The researcher will gain consent from the education authority and head teachers to access secondary schools in the Grampian region. She will attend the secondary school personal and development classes. At the class she will provide the

adolescents with information on the research project and answer any questions that they have during this period. Participants will be asked to sign a consent form to participate in the project.

The methodology design is quantitative and the researcher will ask the adolescents to complete the self report questionnaire pack. The principal researcher will use the school nurse's room in the school to measure each teenager's weight and height. This will protect confidentiality regarding their weight and height from their peers and teachers, and ensure an accurate measurement. The adolescents will be requested once to complete the questionnaire pack and their weight and height will be measured once by the researcher.

7) Please list the principal inclusion and exclusion criteria (IRAS A17)

#### **Inclusion criteria**

The principal inclusion criteria will be that participants are attending a secondary school in the Grampian region and that they are 16 or over.

#### **Exclusion criteria**

There will be essentially no additional exclusion criteria other than meeting the inclusion criteria.

#### **Risks and Ethical Issues**

8) How long do you expect each participant to be in the study in total? (IRAS A21)

(Give brief details)

The length of time that the participant will be in the study will be the length of time that it takes them to complete the questionnaire pack, approximately thirty minutes.

9) How and by whom will potential participants, records or samples be identified?

The participants' records will be only identifiable by the researcher and this documentation will be kept separate from the overall conclusions of the research. These will be kept in a locked cabinet in a room which is also locked when not in use.

10) Will any participants be recruited by publicity through posters, leaflets, adverts or websites? (IRAS A28) (If Yes, please give details of how and where publicity will be conducted, and enclose copy of all advertising material).

No

11) How and by whom will potential participants first be approached? (IRAS A29)

The participants will be first approached by the researcher if they are over 16 at the personal development classes at their secondary school.

12) Will you obtain informed consent from or on behalf of research participants? (IRAS A30-1)

(Please give details of who will take consent and how it will be done, with details of any steps to provide information. Include 'Patient Information Sheet' and 'Consent Forms' in Appendix where applicable).

Informed consent will be gained from the participants by the researcher at the personal development classes. A participant information sheet and consent form is included.

13) How do you intend to report and disseminate the results of the study? (IRAS A51)

The results will be written up in a thesis format for the University of Edinburgh as part of the researcher's degree. The researcher will send a report to the participating schools.



### **Additional information about ethical issues**

To address any distress the questionnaires may cause the young people, a familiar teacher to them and I will be present when the topic will be introduced to the young people and I will be vigilant for any changes in the young people's mood. I will encourage them to ask questions regarding concerns about participating in the research project and highlight to them that participation is voluntary and they can withdraw at any time. There may be a number of outcomes from exploring these issues with the subjects. It may be that any upset can be resolved there and then; it may be best if children are advised to go along to see their GP, or it might be wise that a referral is made to local mental health services. I will do as little or as much as subjects wish, so for example, I would be happy to write referral letters if that would help. They will all be over 16 so clearly any decision about further input must be negotiated with the young people themselves. If I evaluate the issue to be requiring urgent attention, for example, they are a risk to themselves or current abuse is disclosed I will follow child protection procedures. If appropriate I will make an urgent referral. In addition, my clinical supervisor has agreed to be on call during the sessions that I am meeting with the young people to provide me with immediate supervision to discuss concerns that I may have.

### **Scientific and Statistical Review**

#### **14) How will data be collected?**

If quantitative, list proposed measures and reason for inclusion. If qualitative, explain how data will be collected giving reasonable detail (don't just say 'by interviews')

#### **Measures**

- Parental authority questionnaire (Buri, 1991)
- The regulation of emotions questionnaire REQ (Phillips & Power, 2007)
- Emotional eating Behaviour- Emotional Eating Scale Adapted for Use in Children and Adolescents
- Body Mass Index
- Sedentary behaviour- watching T.V or computer use (Christakis et al. 2007) and physical activity (Baine et al 2009).

### Parental authority questionnaire (PAQ; Buri, 1991)

This questionnaire provides a score for permissive, authoritarian and authoritative parenting styles, and has been designed for teenagers to self report on their experience of being parented. There are separate forms consisting of 30 items for them to complete about their mother and father separately. This measure was validated in a high school and a college population (mean age of 17.4 and 18.8 respectively). The test retest reliability of the questionnaire over a two week period was 0.81 for mother's permissiveness, 0.86 for mother's authoritarianism, 0.78 for mother's authoritativeness, 0.85 for father's authoritarianism, 0.77 for father's permissiveness and 0.92 for father's authoritativeness (Buri, 1991), indicating good test retest reliability.

### The regulation of emotions questionnaire (REQ; Phillips & Power, 2007)

The REQ is included in the research because it measures the frequency that young people use internal or external methods to regulate their emotions. It was specifically designed to measure emotional regulation in a UK population who were between the age of 12 and 19. The questionnaire derives four subscales indicating if the methods of coping are functional or dysfunctional (i.e. internal functional, internal dysfunctional, external functional and external dysfunctional). The four scales displayed acceptable internal consistency; the Cronbach's alpha was internal functional 0.76, internal dysfunctional 0.72, external functional 0.66 and external dysfunctional 0.76. This measure was validated against a psychosomatic health problems questionnaire. There was a significant positive correlation between REQ internal dysfunctional emotional regulation strategies and psychosomatic health problems. Additionally, there was significant positive correlation between REQ external dysfunctional emotional regulation strategies and psychosomatic health problems. Overall, this indicates the REQ is measuring unhelpful internal and external coping methods to regulate emotions.

### Eating Behaviour

This will be measured by the Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C) which measures eating in response to a negative effect. The scale consists of 27 items and forms three scales reflecting the urge to eat in response to; anger/frustration, feeling unsettled and depression. This measure has been validated in USA sample of children between the age of 8 and 18 years old. The subscales demonstrated good internal consistency; the Cronbach's alpha was 0.95 for the anger/frustration scale (EES-C\_AAF), 0.92 for the depression scale (EES-C

DEP) and 0.83 for the feeling unsettled scale (EES-C UNS). Furthermore it displayed good convergent validity as participants who showed loss of control of eating on Questionnaire of Eating and Weight Patterns-Adolescent Version had significantly higher EES- C scores. The test retest reliability of average of 3.35 months was adequate with the subscales correlations  $r$  value of 0.59 for EES-C AAF, 0.74 for EES-C DEP and 0.66 for EES-C UNS. Overall, the EES-C is a valid measure for emotional eating in adolescents.

As a measure of healthy eating the adolescents will be asked to complete the Adolescent Food Habits Checklist (ADHC) Johnson *et al.* (2002). This measure was validated in a UK sample of adolescents between the age of 13 and 16. It is designed to measure adolescents' healthy eating behaviour whether they eat high energy foods, vegetables and their snacking behaviour. The internal reliability was Cronbach's alpha was 0.82 and test re-test reliability was high with the correlations between the two time points of 2 weeks delay was  $r=0.90$ . This indicates that the ADHC is a valid measure of adolescents' health eating behaviour.

### Body Mass Index

A young person's weight will be measured in kilograms (kg) and their height measured in metres. To calculate a young person's BMI their weight (kg) will be divided by height in metres squared ( $BMI = kg/m^2$ ).

There is a debate in the literature regarding how useful BMI is at predicting obesity. Duval *et al.* (2007) carried out a meta-analysis of 32 studies investigating obesity indicators as predictors of diabetes and they concluded that BMI, waist circumference (WC) and waist/hip ratio were similar in predicting diabetes. In addition, BMI and WC were equal at predicting body fatness within same sex groups (Borrud *et al.*, 2009). These studies were all conducted in an adult population within the USA and this limits how the results can be applied to an adolescent population. Freedman *et al.*'s (2009) review indicated that BMI is a moderately sensitive indicator of obesity in children. Furthermore, SIGN guideline No 69: Management of obesity in children and young people (2003) concluded that BMI should be used for measuring. NICE guideline 43 (2006) supports SIGN guidelines. Therefore, I am following current guidelines and research to use BMI as an indication of relative weight in an adolescent population.

### Definition of obesity or overweight

This will be based on Cole *et al.*'s (2000) standard definition of overweight and obesity corrected for age and gender.

### Sedentary behaviour

*The young person will be asked to report how many hours he or she spends watching T.V, using a computer and playing video games on a usual school day and a usual weekend day. A question will be included to ask about the number of hours the young person watches T.V and uses a computer for a leisure activity adapted from Christakis et al. (2007).*

The young person will be asked to report separately how many hours they spend every week in different types of physical activity: at school, at a sports club and during free time. This is adapted from Baine *et al.* (2009).

15) What is the sample size for the research? How many participants / data records do you plan to study in total? If there is more than one group, please give further details below. (IRAS A59)

The sample size that is required is 178 participants for my secondary hypotheses and 130 for primary hypotheses. This is based on Green (1991) recommendation of predicting sample size.

16) Outline reasons for your confidence in being able to achieve a sample of at least this size (e.g. by giving details of size of known available sample(s), percentage of this type of sample that typically participate in such studies, opinions of relevant individuals working in that area)

I aim to contact all secondary schools in the region by sending out an information pack in first instance then followed by a telephone call. To gain sufficient numbers I'm currently in process for contacting schools and gaining permission to access schools therefore it is difficult to be certain about the number of schools I will be able to access. However, in area there are currently 29 secondary schools that I plan to invite to participate in my research project. In September 2009 the total school roll for young people in fifth and sixth year for these schools was 5890. In addition there were 4845 pupils in fourth year however it is difficult to know if they are all 16 years

old or over. I am hopeful that I can meet the requirements of the power calculation by attending a relatively small number of schools (certainly less than 10). Over recent years a number of people with their doctoral topics in children and young people have used school-based subjects, and recruitment of subjects has been very successful. This data was gained from the Scottish Government website.

17) Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.  
(IRAS A62)

The analysis I would use to test these associations would be multiple regressions. I would base my analysis on Baron & Kenny's (1986) recommendations about mediator analysis to evaluate if emotional regulation is a mediator between parenting style and emotional eating. The sample size required for this analysis is 130 participants. This is based on Green's (1991) recommended calculation for multiple regression ( $N \geq 50 + (8 \times 10)$ ).

The method of analysis I would use to test my secondary hypotheses is multiple regression to investigate if these factors predict BMI. The sample size that is required is 98 participants. This is based on Green's (1991) recommended calculation for multiple regression ( $50 + (8 \times 6)$ ). The method of analysis I would use is multiple regression to investigate if these factors predict BMI.

**Other Ethical Issues:**

18 a) Do you intend to include any participants who are children?

No      (Delete as applicable)

b) Do you intend to include any participants who are adults unable to consent for themselves through physical or mental incapacity?

No      (Delete as applicable)

c) Do you intend to include any participants who are prisoners or young offenders?

No (Delete as applicable)

If "Yes" to any of the above, please justify their inclusion: (Derived from IRAS Project Filter)

The reason that adolescents are being included in the research is because the aim is to investigate if parenting style and weight is related using measures which are self reported. As far as I am aware previous research has not investigated this by adolescents self report.

19)

(Delete as applicable)

- |    |  |     |
|----|--|-----|
| a. | Will feedback/debriefing be provided     | Yes |
| b. | Will subjects have the right to withdraw | Yes |
| c. | Will records remain confidential         | Yes |
| d. | Will anonymity be ensured                | Yes |
| e. | Will the study involve 'deception'       | No  |
| f. | Will invasive procedures be included     | No  |

If "\*" to any of above, please outline why

I confirm that both my academic and clinical supervisors have seen and approved this ethics proposal. (Insert 'yes' below if true) **Yes**

Date Thesis Proposal Submitted: 8<sup>th</sup> January 2009

**The following School REC forms are to be completed and are required to be kept by both Programme and School Research Ethics Committees.**

**University of Edinburgh,  
School of Health in Social Science  
RESEARCH ETHICS COMMITTEE**

## **SELF-AUDIT CHECKLIST FOR LEVEL 1 ETHICAL REVIEW**

*The audit is to be conducted by*

- ***For funded research:*** *The Principal Investigator ,*
- ***Postdoctoral research fellowships*** – *the applicant in collaboration with the proposed mentor.*
- ***Postgraduate research*** (PhD and Masters by Research) – *the students in collaboration with supervisor.*
- ***Taught Masters dissertation work and Undergraduate dissertation/project work:*** *the applicant in collaboration with dissertation/project supervisor*

*Note: all members of staff and students should conduct ethical self-audit of their proposed research as part of the proposal process.*

### **1. IRAS or LOCAL AUTHORITY/SOCIAL WORK ethical review**

*Does the project require IRAS review or review by bodies abroad?* NO

### **2. Protection of research subject confidentiality**

*Are there any issues of CONFIDENTIALITY which are not ADEQUATELY HANDLED by normal tenets of academic confidentiality?*

NO

These include well-established sets of undertakings that may be agreed more or less explicitly with collaborating individuals/organisations, for example, regarding:

- (a) Non-attribution of individual responses;
- (b) Individuals and organisations anonymised in publications and presentation;
- (c) Specific agreement with respondents regarding feedback to collaborators and publication.

### **3. Data protection and consent**

*Are there any issues of DATA HANDLING and CONSENT which are not ADEQUATELY DEALT WITH and compliant with established procedures?* NO

These include well-established sets of undertakings, for example regarding:

- (a) Compliance with the University of Edinburgh's Data Protection procedures (see [www.recordsmanagement.ed.ac.uk](http://www.recordsmanagement.ed.ac.uk));
- (b) Respondents giving consent regarding the collection of personal data;
- (c) No special issues arising about confidentiality/informed consent.

### **4. Moral issues and Researcher/Institutional Conflicts of Interest**

*Are there any SPECIAL MORAL ISSUES/CONFLICTS OF INTEREST?*

NO

- (a) An example of conflict of interest would be a financial or non-financial benefit for him/herself or for a relative or friend.
- (b) Particular moral issues or concerns could arise, for example where the purposes of research are concealed, where respondents are unable to provide informed consent, or where research findings would impinge negatively/differentially upon the interests of participants.



**5. Potential physical or psychological harm, discomfort or stress**

(a) Is there a SIGNIFICANT FORSEEABLE POTENTIAL FOR PSYCHOLOGICAL HARM OR STRESS for participants?

NO

(b) Is there a SIGNIFICANT FORSEEABLE POTENTIAL FOR PHYSICAL HARM OR DISCOMFORT?

NO

(c) Is there a SIGNIFICANT FORSEEABLE RISK TO THE RESEARCHER?

NO

**6. Bringing the University into disrepute**

*Is there any aspect of the proposed research which might bring the University into disrepute?*

NO

**7. Vulnerable participants**

*Are any of the participants or interviewees in the research vulnerable, e.g. children and*  
Yes

*young people, people who are in custody or care, such as students at school, self help groups,*

*residents of nursing home?*

Young people who are over 16 at school

**8. Duty to disseminate research findings**

**Will all participants and relevant stakeholders have access to a clear, understandable and accurate summary of the research findings? YES**

**Overall assessment**

If all the answers are NO, the self audit has been conducted and confirms the ABSENCE OF REASONABLY FORESEEABLE ETHICAL RISKS. The following text should be emailed to the relevant person, as set out below:

**Text: “I confirm that I have carried out the School Ethics self-audit in relation to [my / name of researcher] proposed research project [name of project and funding body] and that no reasonably foreseeable ethical risks have been identified.”**

- **Research grants**– the Principal Investigator should send this email to the SHSS Research Ethics Administrator (L.Sheal@ed.ac.uk) it will be kept on file with the application.
- **Postdoctoral research fellowships** – the Mentor should ensure that the Fellow email the SHSS Research Ethics Administrator Office (L.Sheal@ed.ac.uk) where it will be kept on file with the application.
- **Postgraduate research (PhD and Masters by Research) – there is no need to send the Level 1 email. The ethical statement should be included in the student’s Review reports.**
- **Taught Masters dissertation work and Undergraduate dissertation/project work – there is no need to send the level 1 email. The dissertation/project supervisor should retain the ethical statement with the student’s dissertation/project papers.**

If one or more answers are YES, risks have been identified and level 2 audit is required. See the School Research Ethics Policy and Procedures webpage at <http://www.ed.ac.uk/schools-departments/health/research> for full details.

**University of Edinburgh**  
**School of Health in Social Science**  
**RESEARCH AND RESEARCH ETHICS COMMITTEE**  
**ETHICAL REVIEW FORM FOR LEVEL 2 AND LEVEL 3**  
**AUDITING**



This form should be used for any research projects carried out under the auspices of SHSS that have been identified by self-audit as requiring detailed assessment - i.e. level 2 and level 3 projects under the three-tier system of ethical approval that has been developed by the Research Ethics Committee of the School. The levels within the system are explained in the SHSS Research Ethics Policy and Procedures document. Please indicate which level applies to your research.

This form provides general School-wide provisions. Proposers should feel free to supplement these with detailed provisions that may be stipulated by research collaborators (e.g. NHS) or professional bodies (e.g. BSA, SRA). The signed and completed form should be submitted, along with a copy of the research proposal, research instruments and information and consent sheets to the relevant person (Subject Area Research Ethics Co-ordinator for staff, postdoctoral fellows and postgraduate students, Dissertation supervisor for undergraduate student projects;). Level 3 requests should also be lodged, (if possible electronically) with the School Research Ethics Administrator for forwarding to the Research Ethics Committee.

Research Ethics Committee will monitor level 2 proposals yearly to satisfy themselves that the School Ethics Policy and Procedures are being complied with. They will revert to proposers in cases where there may be particular concerns or queries. For level 2 and 3 audits, work should not proceed until issues raised have been considered by the appropriate people. Level 3 applications should be submitted well in advance of a required date of approval (see submission dates on shared area address).

The form developed by the College of Humanities and Social Science will be used for level 2 and 3 reviews. If the answer to any of the questions below is 'yes', please give details of how this issue is being/will be addressed to ensure that ethical standards are maintained.

<b>1 THE RESEARCHERS</b>	
Your name and position	Arlene Ross, Trainee Clinical Psychologist
Proposed title of research	An investigation of parenting style and weight in adolescence
Funding body	NHS/NES
Time scale for research	To be completed by 2 August 2010
List those who will be involved in conducting the research, including names and positions (e.g. 'PhD student')	Arlene Ross
<b>2 RISKS TO, AND SAFETY OF, RESEARCHERS</b>	
Those named above need appropriate training to enable them to conduct the proposed research safely and in accordance with the ethical principles set out by the College	<b>No</b>
Researchers are likely to be sent or go to any areas where their safety may be compromised, or they may need support to deal with difficult issues.	<b>No</b>
Could researchers have any conflicts of interest?	<b>No</b>

<b>3 RISKS TO, AND SAFETY OF, PARTICIPANTS</b>	
Could the research induce any psychological stress or discomfort?	<p><b>Yes</b></p> <p><b>Please see plan to address this</b></p> <p>To address any distress the questionnaires may cause the young people, a familiar teacher to them and I will be present when the topic is introduced to the young people and I will be vigilant to any changes in the young people's mood. I will encourage them to ask questions regarding concerns about participating in the research project and highlight to them that participation is voluntary and they can withdraw at any time. There may be a number of outcomes from exploring these issues with the subjects. It may be that any upset can be resolved there and then; it may be best if children are advised to go along to see their GP, or it might be wise that a referral is made to local mental health services. I will do as little or as much as subjects wish, so for example, I would be happy to write referral letters if that would help. They will all be over 16 so clearly any decision about further input must be negotiated with the young people themselves. If I evaluate the issue to be requiring urgent attention for example they are a risk to themselves or current abuse is disclosed I will follow child protection procedures. If appropriate I will make an urgent referral. In addition, my clinical supervisor Andy Keen, Health Psychologist, has agreed to be on call during the sessions that I am meeting with the</p>

	young people to provide me with immediate supervision to discuss concerns that I may have.
Does the research involve any physically invasive or potentially physically harmful procedures?	<b>No</b>
Could this research adversely affect participants in any other way?	<b>No</b>
<b>4 DATA PROTECTION</b>	
<b>WILL ANY PART OF THE RESEARCH INVOLVE AUDIO, FILM OR VIDEO RECORDING OF INDIVIDUALS?</b>	<b>No</b>
Will the research require collection of personal information from any persons without their direct consent?	<b>No</b>
How will the confidentiality of data, including the identity of participants (whether specifically recruited for the research or not) be ensured?	The participants' records will be only identifiable by the researcher and this documentation will be kept separate from the overall conclusions of the research. These will be kept in a locked cabinet in a room which is also locked when not in use. The participant will be allocated a number and this will be what they will be referred to during the analysis

	and the write up
Who will be entitled to have access to the raw data?	Arlene Ross only- Principal researcher
How and where will the data be stored, in what format, and for how long?	The data will be kept separate from the overall conclusions of the research. These will be kept in a locked cabinet in a room which is also locked when not in use. These will be kept until October 2010 when the researcher completes her thesis project.
What steps have been taken to ensure that only entitled persons will have access to the data?	The researcher will be the only person who has a key to the locked cabinet.
How will the data be disposed of?	The data will be shredded and disposed using the NHS confidentiality protocol.
How will the results of the research be used?	The results will be written up in a thesis format for the University of Edinburgh as part of the researcher's degree.
What feedback of findings will be given to participants?	The researcher will send a report to the participating schools
Is any information likely to be passed on to external companies or organisations in the course of the research?	<b>No</b>
Will the project involve the transfer of personal data to	<b>No</b>

countries outside the European Economic Area?	
<b>5 RESEARCH DESIGN</b>	
The research involves living human subjects specifically recruited for this research project  <i>If 'no', go to section 6</i>	<b>Yes</b>
<b>HOW MANY PARTICIPANTS WILL BE INVOLVED IN THE STUDY?</b>	A minimum of 130 participants
What criteria will be used in deciding on inclusion/exclusion of participants?	<p><b>Inclusion criteria</b></p> <p>The principal inclusion criteria will be that participants are attending a secondary school in the Grampian region and that they are 16 or over.</p> <p><b>Exclusion criteria</b></p> <p>There will be essentially no additional exclusion criteria other than meeting the inclusion criteria.</p>
How will the sample be recruited?	The researcher will gain consent from the education authority and head teachers to access secondary schools in the Grampian region. She will attend the secondary school personal and development classes. At the class she will provide the adolescents with information on the research project and answer any



	questions that they have during this period. Participants will be asked to sign a consent form to participate in the project.
Will the study involve groups or individuals who are in custody or care, such as students at school, self help groups, residents of nursing home?	<b>No</b>
Will there be a control group?	<b>No</b>
What information will be provided to participants prior to their consent? (e.g. information leaflet, briefing session)	Please see attached consent form and information sheet
Participants have a right to withdraw from the study at any time. Please tick to confirm that participants will be advised of their rights, including the right to continue receiving services if they withdraw from the study..	<b>YES</b>
Will it be necessary for participants to take part in the study without their knowledge and consent? (e.g. covert observation of people in non-public places)	<b>No</b>
Where consent is obtained, what steps will be taken to ensure that	The participants will be asked to sign a consent form and this will be kept

a written record is maintained?	in a locked cabinet separate from the research outcomes.
In the case of participants whose first language is not English, what arrangements are being made to ensure informed consent?	The school will highlight this to the researcher before entering the school and will guide me on how to enable the person to interpret the consent form.
Will participants receive any financial or other benefit from their participation?	<b>No</b>
Are any of the participants likely to be particularly vulnerable, such as elderly or disabled people, adults with incapacity, your own students, members of ethnic minorities, or in a professional or client relationship with the researcher?	<b>No</b>
Will any of the participants be under 16 years of age?	<b>No</b>
Do the researchers named above need to be cleared through the Disclosure/Enhanced Disclosure procedures?	<b>Yes</b> As an NHS employee I have already received an enhanced disclosure form and I routinely go into schools as part of my clinical post.
Will any of the participants be interviewed in situations which will compromise their ability to give informed consent, such as in prison, residential care, or the care of the local authority?	<b>No</b>

<b>6      EXTERNAL PROFESSIONAL BODIES</b>	
Is the research proposal subject to scrutiny by any external body concerned with ethical approval?	<b>Yes</b> Education authority
If so, which body?	Education authority-
Date approval sought	
<b>OUTCOME, IF KNOWN OR</b>	Ongoing- both been approached and awaiting the outcome
<b>DATE OUTCOME EXPECTED</b>	Unknown
<b>7      ISSUES ARISING FROM THE PROPOSAL</b>	
<p><u>In my view, ethical issues have been satisfactorily addressed, OR</u></p> <p>In my view, the ethical issues listed below arise and the following steps are being taken to address them:</p> <p><b>SIGNATURE ETHEL QUAYLE</b></p> <p><b>Date 3 February 2010</b></p>	

Email correspondence with Ethel Quayle to confirm I had ethical approval:

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**From:** Ethel Quayle [Ethel.Quayle@ed.ac.uk]  
**Sent:** 03 February 2010 12:58  
**To:** Ross Arlene (NHS Grampian)  
**Subject:** RE: Changes to ethics form

**Hi Arlene,**  
**Yes. You had made the changes required by the Committee and have discussed these with your supervisor.**

**Best wishes,**

**Ethel**

**Quoting "Ross Arlene (NHS Grampian)" <arlene.ross@nhs.net>:**

**> Hi Ethel,**  
**>**  
**> Thank you for this. Just to check, does this mean i have ethical**  
**> approval to go ahead with my project.**  
**>**  
**> Thank you**  
**> Arlene**

### **Appendix III**

**Email confirmation from the Education Authority that the researcher  
could approach secondary schools in the area**

(To protect anonymity, identifiable information has been removed)

**Received on 17<sup>th</sup> February 2010 at 09:00am**

Arlene,

Not sure what response you will get from schools due to the nature of the research and time commitment expected from school staff but in principle David & I are happy for you to approach them directly.

Jan Roy

Jan Roy

Service Manager Schools & Children's Services

## **Appendix IV**

### **Letter to Head Teachers inviting secondary schools to participate in the research project**

(To protect anonymity, identifiable information has been removed)

NHS

Telephone:

Email:

Dear,

I'm currently in my final year of my doctoral training in Clinical Psychology at the University of Edinburgh. As part of the course I am undertaking a research project, which involves senior school children. I am contacting you to ask you to consider allowing me to carry out my research project within ..... Academy.

My research is on the link between adolescents' weight and various other factors. The factors that I am investigating are parenting style (the way children are brought up); emotional regulation (the extent to which people can manage naturally difficult emotions), and emotional eating (the tendency of some people to eat when they experience difficult emotions like sadness or stress). I am also obtaining measures of young peoples' diets and levels of activity.

In order to include young people over 16 from your school as subjects, I would like to come along to a suitable class, maybe their personal development class, at a time that suits the school. I would tell the pupils about the project and answer any questions. If anyone wished to be involved then I would ask them complete a relative small number of questionnaires (would take about 15 minutes), and measure their height and weight (in a separate, private room). I would emphasise at all times that there is no need for pupils to take part and that they can withdraw at any time. I would of course be as flexible as possible in any arrangements with your school.

I have received ethical approval for my research and research protocol from the Ethics Committee at the University of Edinburgh, and Service Manager for Schools & Children's services, ????, has agreed that I can conduct this study in local secondary schools.



I would be delighted to answer any questions that you have or tell you more about the project. You can contact me at: ..... If you agree to this research project being carried out within ..... Academy, please contact me on either the above contacts and I will arrange a suitable time with you to discuss this further.

Yours sincerely

Arlene Ross

Trainee Clinical Psychologist

## **Appendix V**

### **Participant information sheet**

(To protect anonymity, identifiable information has been removed)

## **INFORMATION SHEET**

### **An investigation of parenting style and weight in adolescence**

#### **Researcher: Arlene Ross**

You are being invited to participate in this research project because you are between the age of sixteen and eighteen. Before you decide, it is important for you to understand why we are running this project and what participating will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask Arlene Ross if there is anything that is not clear or if you would like more information. Thank you for reading this.

#### **What is the purpose of this project?**

You probably know that here in Scotland we seem to be getting heavier and that is true of adults, teenagers, and children. There has been some research carried out to try to find out why that is, but there is still lots we don't know. The aim of the project is to investigate if a range of factors such as parenting style (the ways in which your mum and dad brought you up); sleeping habits; eating behaviour and other aspects of lifestyle are related to weight in senior school children.

#### **What will I have to do if I choose to take part?**

You will be asked once to complete a questionnaire pack during your personal development class which takes approximately 30 minutes. The questions are about your mother and father's parenting style, your eating behaviour, your sleep habits, the amount of hours you spend watching T.V and participating in physical exercise. You will also be asked to report on your father and mother's participation in physical activity and their weight. The researcher, Arlene Ross, will measure your height and weight in a separate room in private.

#### **What happens to the information collected about me?**

The researcher will be the only person who will have access to the data collected about you. This will be stored on a password-protected computer and in a locked cabinet.

#### **What will happen to the results of this project?**

This research project is being undertaken as part of a university course (the doctoral training programme in Clinical Psychology which is run by the University of Edinburgh). Consequently, the results will be written up in a report format. The information collected will be anonymous and no one who reads the report will be able to tell what your particular results were. In addition, I may try to publish the results in a scientific journal and may present the results at scientific and professional meetings, so that other professionals are aware of the findings (again

no one will be able to tell what your particular results were). I will send a copy of the report to your school for you to read.

**Do I have to take part?**

No. Participation in this project is entirely voluntary. You are free to withdraw from this project at any time.

Thank you for considering taking part in this project. Should you have any further questions please ask.

## **Appendix VI**

### **Participant consent form**

(To protect anonymity, identifiable information has been removed)



**Clinical & Health Psychology  
School of Health in Social Science  
University of Edinburgh  
Teviot Place  
Edinburgh  
EH8 9AG**

**Centre number  
Study number  
Participant Identification number:**

**Consent Form**

**Title of project: An investigation of parenting style and weight in adolescence.**

**Name of researcher: Arlene Ross**

**Please initial boxes**

1. I confirm that I have read and understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactory.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.

3. I agree to take part in the above study

\_\_\_\_\_  
**Name of participant**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Researcher**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Signature**

## **Appendix VII**

### **Personal information**

**Questionnaire pack**

**Participate number:** .....

**Height**.....

**Weight**.....

**Questions about you**

1. Are you Male or Female? .....
2. How old are you? .....



## **Appendix VIII**

### **Parental Authority Questionnaire (PAQ) (*Buri, 1991*)**

(Questions about their mother and father)

### Questions about your mother

For each of the following statements, tick the number on the 5 point scale that best describes how that statement applies to you and your mother during your years of growing up at home. There are no right or wrong answers, so don't spend a lot of time on any one item. I'm looking for your overall impression regarding each statement. Be sure not to omit any items.

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
1	While I was growing up my mother felt that in a well-run home the children should have their way in the family as often as the parents do.					
2	Even if her children didn't agree with her, my mother felt that it was for our own good if we were forced to do what she thought was right.					
3	Whenever my mother told me to do something as I was growing up, she expected me to do it immediately without asking any questions.					
4	As I was growing up, once family rules had been established, my mother discussed the reasoning behind the family rules with the children in the family.					
5	My mother has always encouraged verbal give and take whenever I have felt that family rules and restrictions were unreasonable.					
6	My mother has always felt that what children need is to be free to make up their own minds and to do what they want to do, even if this does not agree with what their parents might want.					
7	As I was growing up my mother did not allow me to question any decisions she had made.					
8	As I was growing up my mother directed the activities and decisions of the children in the family through reasoning and discipline.					
9	My mother has always felt that more force should be used by parents in order to get their children to behave the way they are supposed to.					

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
10	As I was growing up my mother did not feel that I needed to obey rules and regulations of behaviour simply because someone in authority had established them.					
11	As I was growing up I knew what my mother expected of me in my family, but I also felt free to discuss those expectations with my mother when I felt that they were unreasonable.					
12	My mother felt that wise parents should teach their children early just who is boss in the family.					
13	As I was growing up, my mother seldom gave me expectations and guidelines for my behaviour.					
14	Most of the time as I was growing up my mother did what the children in the family wanted when making family decisions.					
15	As the children in my family were growing up, my mother consistently gave us direction and guidance in rational and objective ways.					
16	As I was growing up my mother would get very upset if I tried to disagree with her.					
17	My mother feels that most problems in society would be solved if parents would not restrict their children's activities, decisions and desires as they are growing up.					
18	As I was growing up my mother let me know what behaviour she expected of me and if I didn't meet those expectations, she punished me.					
19	As I was growing up my mother allowed me to decide most things for myself without a lot of direction from her.					
20	As I was growing up my mother took the children's opinions into consideration when making family decisions, but she would not decide something simply because the children wanted it.					
21	My mother did not view herself as responsible for					

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
	directing and guiding my behaviour as I was growing up.					
22	My mother had clear standards of behaviour for the children in our home as I was growing up, but she was willing to adjust those standards to the needs of each of the individual child in the family.					
23	My mother gave me direction for my behaviour and activities as I was growing up and she expected me to follow her direction, but she was always willing to listen to my concerns and discuss that direction with me.					
24	As I was growing up my mother allowed me to form my own point of view on family matters and she generally allowed me to decide for myself what I was going to do.					
25	My mother has always felt that most problems in society would be solved if we could get parents to strictly and forcibly deal with their children when they don't do what they are supposed to as they are growing up.					
26	As I was growing up my mother often told me exactly what she wanted me to do and how she expected me to do it.					
27	As I was growing up my mother gave me clear direction for my behaviours and activities, but she also understood when I disagreed with her.					
28	As I was growing up my mother did not direct the behaviours, activities and desires of the children in the family.					
29	As I was growing up I knew what my mother expected of me in the family and she insisted I conform to those expectations simply out of respect for her authority.					
30	As I was growing up, if my mother made a decision in the family that hurt me, she was willing to discuss that decision with me and to admit it if she had made a mistake.					

### Questions about your father

For each of the following statements, tick the number on the 5 point scale that best describes how that statement applies to you and your father during your years of growing up at home. There are no right or wrong answers, so don't spend a lot of time on any one item. I'm looking for your overall impression regarding each statement. Be sure not to omit any items.

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
1	While I was growing up my father felt that in a well-run home the children should have their way in the family as often as the parents do.					
2	Even if his children didn't agree with him, my father felt that it was for our own good if we were forced to do what he thought was right.					
3	Whenever my father told me to do something as I was growing up, he expected me to it immediately without asking any questions.					
4	As I was growing up, once family rules had been established, my father discussed the reasoning behind the family rules with the children in the family.					
5	My father has always encouraged verbal give and take, whenever I have felt that family rules and restrictions were unreasonable.					
6	My father has always felt that what children need is to be free to make up their own minds and to do what they want to do, even if this does not agree with what their parents might want.					
7	As I was growing up my father did not allow me to question any decisions he had made.					
8	As I was growing up my father directed the activities and decisions of the children in the family through reasoning and discipline.					
9	My father has always felt that more force should be used by parents in order to get their children to behave the way they are supposed to.					
10	As I was growing up my father did not feel that I needed to obey rules and regulations of					

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
	behaviour simply because someone in authority had established them.					
11	As I was growing up I knew what my father expected of me in my family, but I also felt free to discuss those expectations with my father when I felt that they were unreasonable.					
12	My father felt that wise parents should teach their children early just who is the boss in the family.					
13	As I was growing up, my father seldom gave me expectations and guidelines for my behaviour.					
14	Most of the time as I was growing up my father did what the children in the family wanted when making family decisions.					
15	As the children in my family were growing up, my father consistently gave us direction and guidance in rational and objective ways.					
16	As I was growing up my father would get very upset if I tried to disagree with him.					
17	My father feels that most problems in society would be solved if parents would not restrict their children's activities, decisions and desires as they are growing up.					
18	As I was growing up my father let me know what behaviour he expected of me and if I didn't meet those expectations, he punished me.					
19	As I was growing up my father allowed me to decide most things for myself without a lot of direction from him.					
20	As I was growing up my father took the children's opinions into consideration when making family decisions, but he would not decide something simply because the children wanted it.					
21	My father did not view him self as responsible for directing and guiding my behaviour as I was growing up.					

		Strongly disagree (1)	Disagree (2)	Neither disagree or agree (3)	Agree (4)	Strongly agree (5)
22	My father had clear standards of behaviour for the children in our home as I was growing up, but he was willing to adjust those standards to the needs of each individual child in the family.					
23	My father gave me direction for my behaviour and activities as I was growing up and he expected me to follow his direction, but he was always willing to listen to my concerns and discuss that direction with me.					
24	As I was growing up my father allowed me to form my own point of view on family matters and he generally allowed me to decide for myself what I was going to do.					
25	My father has always felt that most problems in society would be solved if we could get parents to strictly and forcibly deal with their children when they don't do what they are supposed to as they are growing up.					
26	As I was growing up my father often told me exactly what he wanted me to do and how he expected me to do it.					
27	As I was growing up my father gave me clear direction for my behaviours and activities, but he also understood when I disagreed with him.					
28	As I was growing up my father did not direct the behaviours, activities and desires of the children in the family.					
29	As I was growing up I knew what my father expected of me in the family and he insisted I conform to those expectations simply out of the respect for his authority.					
30	As I was growing up, if my father made a decision in the family that hurt me, he was willing to discuss that decision with me and to admit it if he had made a mistake.					

## **Appendix IX**

### **The Regulation of Emotions Questionnaire (REQ) (Phillips & Power, 2007)**



### Questions about what you do to cope with your feelings

For each of the following statements, tick the number on the 5 point scale that best describes how that statement applies to how you cope with your feelings. There are no right or wrong answers, so don't spend a lot of time on any one item. I'm looking for how you overall manage your feelings. Be sure not to omit any items.

		Not at all 1	2	3	4	Always 5
1	I talk to someone about how I feel					
2	I take my feelings out on others verbally (e.g. shouting, arguing)					
3	I ask others for advice					
4	I review (rethink) my thoughts or beliefs					
5	I harm or punish myself in some way					
6	I do something energetic					
7	I dwell on my thoughts and feelings (e.g. it goes round and round...)					
8	I seek physical contact from friends or family (e.g. a hug, hold hands)					
9	I review (rethink) my goals or plans					
10	I take my feeling out on others physically (e.g. fighting, lashing out)					
11	I put the situation into perspective					
12	I concentrate on a pleasant activity					
13	I try to make others feel bad (e.g. being rude, ignoring them)					
14	I think about people better off and make myself feel worse					
15	I plan what I could do better next time					
16	I keep the feeling locked up inside					
17	I bully other people					
18	I take my feelings out on objects around me (e.g. deliberately)					
19	Things feel unreal (e.g. I feel strange, things around me feel strange)					

## **Appendix X**

**Emotional Eating Scale Adapted for Use in Children and Adolescents  
(EES-C) (Tanofsky-Kraff *et al.*, 2007)**

### Questions about what feelings might make you want to eat

We all react to different feelings in different ways. Some types of feelings make us want to eat. Please tell me how much the following feelings make you want to eat by ticking the appropriate box. There are no right or wrong answers.

When I feel this way	I have no desire to eat	I have a small desire to eat	I have a moderate desire to eat	I have a strong desire to eat	I have a very strong desire to eat	On average, how many days a week do you eat because you feel this way? (0-7 days)
1 Resentful						
2 Discouraged						
3 Shaky						
4 Worn out						
5 Not doing enough						
6 Excited						
7 Disobedient						
8 Down						
9 Stressed out						
10 Sad						
11 Uneasy						
12 Irritated						

When I feel this way	I have no desire to eat	I have a small desire to eat	I have a moderate desire to eat	I have a strong desire to eat	I have a very strong desire to eat	On average, how many days a week do you eat because you feel this way? (0-7 days)
13 Jealous						
14 Worried						
15 Frustrated						
16 Lonely						
17 Furious						
18 On edge						
19 Confused						
20 Nervous						
21 Angry						
22 Guilty						
23 Bored						
24 Helpless						
25 Upset						
26 Happy						

## **Appendix XI**

### **Adolescent Food Habits Checklist (AFHC) (Johnson *et al.*, 2002)**

### Questions about the type of food you eat

We all eat different foods and I want to get an overall impression about your diet. For each of the following statements, tick the appropriate box. There are no right or wrong answers.

1. If I'm having lunch away from home, I often choose a low fat option.  
**True / False / I never have lunch away from home**
2. I usually avoid eating fried foods. **True / False**
3. I usually eat a dessert or pudding if there is one available. **True / False**
4. I make sure I eat at least one serving of fruit a day. **True / False**
5. I try to keep my overall fat intake down. **True / False**
6. If I am buying crisps, I often choose a low-fat brand. **True / False**
7. I avoid eating lots of sausages and burgers.  
**True / False / I never eat sausages or burgers**
8. I often buy pastries or cakes. **True / False**
9. I try to keep overall sugar intake down. **True / False**
10. I make sure I eat at least one serving of vegetables or salad a day.  
**True / False**
11. If I am having a desert at home, I try to have something low in fat.  
**True / False**
12. I rarely eat takeaway meals. **True / False**
13. I try to ensure I eat plenty of fruit and vegetables. **True / False**
14. I often eat sweet snacks between meals. **True / False**
15. I usually eat at least one serving of vegetables (excluding potatoes) or salad with my evening meal. **True / False**
16. When I am buying a soft drink, I usually choose a diet drink. **True / False**
17. When I put butter or margarine on bread, I usually spread it thinly.  
**True / False / I never have butter or margarine**
18. If I have a packed lunch, I usually include some chocolate or biscuit.  
**True / False / I never have a packed lunch**
19. When I have a snack between meals, I often choose fruit.  
**True / False / I never eat snacks between meals**
20. If I am having a dessert or pudding in a restaurant, I usually choose the healthiest one. **True / False / I never have desserts in restaurants**
21. I often have cream on desserts. **True / False / I don't eat desserts**
22. I eat at least three servings of fruit most days. **True / False**
23. I generally try to have a healthy diet. **True / False**

## **Appendix XII**

### **Sedentary behaviour and exercise questions**

(Adapted from Andersen *et al.*, 1998)

Questions about the time you spend watching T.V, on a computer and doing  
physical exercise

1. How many hours do you spend you spend watching T.V:

on a weekday.....?

on a weekend day.....?

2. How many hours do you spend using a computer for leisure or playing  
computer games:

on a weekday.....?

on a weekend day.....?

3. How many hours do you spend doing physical activity at

at school?..... at a sports club?..... during your free time?.....



## **Appendix XIII**

**Table 3.9 The mean and standard deviation for the six variables that were transformed**

**Table 3.9** The mean and standard deviation for the six variables that were transformed

Variable	N			Mean (SD)		
	Male	Female	All participants	Male	Female	All participants
<b>BMI</b>	56	51	112	0.04 (0.007)	0.04 (0.007)	0.04 (0.007)
<b>Father permissive</b>	52	44	99	3.7(0.8)	3.3 (0.7)	3.3 (0.75)
<b>IDF</b>	56	50	110	0.1 (0.03)	0.09 (0.03)	0.1 (0.03)
<b>EXDF</b>	56	50	111	0.1 (0.04)	0.1 (0.04)	0.1 (0.04)
<b>Weekly Exercise</b>	39	39	95	1.8 (0.8)	1.5 (0.7)	1.7 (0.7)
<b>Weekly sedentary behaviour</b>	39	39	92	3.6 (0.4)	3.5 (0.5)	3.6 (0.4)

**IDF = internal dysfunctional emotional strategies**

**EXDF = external dysfunctional emotional strategies**